PROSPECT OF FORMING A COMMON CURRENCY AREA IN ASEAN-10 COUNTRIES

THESIS

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ABSTRACT

This study aims to examine the feasibility and prospect of ASEAN-10 countries for common currency area. According Sigma Convergence Criteria defined by Chowdhury (2004), sigma convergence model is proposed whereby available convergence played as a good model to examine the feasibilities of economic indicators to support the prospect of ASEAN-10 countries to create common currency area.

Method that is used in this research consists of the EMU (European Monetary Union) model principle in launching their single currency (Pitchford and Cox, 1997) and the sigma convergence model (Chowdhury, 2004). Pitchford and Cox (1997) edited the European Monetary Union (EMU) principles for launching single currency for Europe. This research studies economic indicators that have been used, according to the editors of EMU principles for launching single currency for Europe, there are; Consumer Price Index (CPI), Real Exchange Rate in US dollars (RER), Growth rates of Foreign Exchange Reserves (GFER), Growth rates of Real Volume of Trade (GRVT), Growth rates of Real Relative Volume of Trade (GRRVT), and Growth rates of Per Capita Real GDP at factor cost (GRYPC).

Through Eviews-6 this research studies examined the panel data cross section sigma convergence econometrics model, in which the result shows that the β coefficient of all economic indicators value are negative, whether this result according to Chowdhury (2004) show signs as convergence over the whole period of 1992s through 2009s, which means that the six indicators that examined by this research support the feasibility of ASEAN-10 countries to create common currency area. This convergence result also convinces that ASEAN-10 countries have a good prospect of forming a common currency area as their single currency to enhance their economic performance to a brighter future.

Keywords: Common Currency Area, Convergence Criteria, ASEAN-10 countries, CPI, RER, GFER, GRVT, GRRVT, GRYPC

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This final assignment is written to fulfill the final requirement to graduate from the Faculty of Economics of Diponegoro University. The goal of the study is to gain an insight on the possibility of common currency area in ASEAN-10 countries.

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CHAPTER I

INTRODUCTION

1.1 Background of the study

Instability in International monetary arrangements has been a fact of life for policy makers since the breakdown of the Bretton Woods agreements in the early 1970s. The 1980s in particular were characterized by an exceptional misalignment of the major currencies. The decade saw massive capital flight towards the United States and other industrialized countries from the developing world, particularly after the debt crises and the cutting-off of new loans. Macroeconomic policies improved in the majority of developing countries in the 1990s, but the expected growth benefits failed to materialize, at least to the extent that many observers had forecast. In addition, a series of financial crises severely depressed growth and worsened poverty (World Bank, 2005, excerpt from Assessing Regional Integration in Africa (ARIA III), 2008). In the words of Mundell (excerpt from Assessing Regional Integration in Africa (ARIA III), 2008)

> "The period since floating began has proved to be one of the most unstable periods in monetary history. For the developing countries, the last three decades have been characterized by high inflation, exchange rate instability and low growth. A substantial part of the blame for this situation must lie with the deterioration in the global international environment and especially the lapse in discipline due to the absence of an international monetary system."

In the 1950s and 1960s, the economies of the most developed capitalist countries (North America, Western Europe, Japan and Australasia), as well as a great deal of developing countries, enjoyed an unprecedented boom, commonly

designated as “the Golden Age”. It was characterized by low unemployment, low inflation and rapid growth of living standards, and one of its cornerstones was the monetary arrangements outlined at the famous meeting in Bretton Woods in 1944, the penultimate year of the Second World War. In so far as it eliminated the spectrum of global economic insecurity that predominated in the 1930s, it was extremely successful. As table 1.1 illustrates, the mean average growth rate for both output and trade reached historically unprecedented levels, with more than three times higher than the pre-war level for output and fifteen times higher for trade. Pointedly, the coefficient of variation, which reflects the dispersion around the mean in the performance of these variables, also declined significantly during the Bretton Woods period. In the second half of the 1960s and through the 1970s, however, the whole structure of profitable growth threatened to fall apart (Glyn, 2006, excerpt from Assessing Regional Integration in Africa (ARIA III), 2008).

Table. 1.1
Growth and Volatility of World Output and Trade
1870-1990

	Output		Trade	
	Mean Average Growth Rate (%)	Coefficient of Variation	Mean Average Growth Rate (%)	Coefficient of Variation
Pre-War				
1870-1913	2.8	0.75	3.6	0.71
Interwar				
1924-1929	3.7	0.22	5.7	0.39
1929-1937	1.3	4.53	0.5	16.65
Post-war				
1950-1973	4.7	0.34	7.5	0.56
1973-1990	3.1	0.53	4.5	1.09

Source: Kitson and Michie, 1995, (excerpt from Assessing Regional Integration in Africa (ARIA III), 2008)

In 2007, The U.S economy lost its seat to the European Union as the world’s largest economies. The EU’s economy produced $14.4 trillion in goods

and services, while U.S GDP came in at $13.86 trillion. Combined, the two produce over 40% of the world's economic power, which totals $65.82 trillion (source: CIA World Factbook, Rank Order GDP excerpt from Kimberly, about.com guide to US economy, Tuesday, February 12, 2008). These figures are measured using purchasing power parity, which takes into account the standard of living of each country. This provides a more fair and relevant measured of GDP. However, the U.S. still has the largest economy of any single country. The next largest is China, at $7 trillion, followed by Japan at $4 trillion. The largest single EU country is Germany, at $2.8 trillion, which has been surpassed by India, where GDP was $2,965 trillion in 2007. The U.S. economy is growing, but just not as fast as the EU. Many analysts initially said that the EU "experiment" was doomed to failure, since these vastly different countries could never work together as a unified economy. Instead, the EU is so successful that areas such as Southeast Asia and Latin America are considering unified economies. The EU now has an economy of scale that eats into the comparative advantage the U.S. has traditionally enjoyed. Furthermore, the EU's currency, the Euro, is now competing with the dollar as a global currency. Thanks to these competitive pressured, a U.S. recession could be the precursor to a lower standard of living that may not return to previous, stronger levels (Kimberly, 2008). Although financial markets rose sharply after George Bush's decisive re-election, the huge imbalances plaguing the US economy have not gone away. Attention has now refocused on these structural problems, hence the renewed pressure on the dollar. America has a massive deficit in its current account, where the importing more

goods and services than it is exporting. The size of the gap in dollar terms which is the amount often called “red ink”, is close to $600bn (£325.6bn) in 2004, this condition described that it is reached almost 6% of America’s overall economic activity. In some ways, America’s deficit has served the global economy well. By acting as a consumer of goods produced in Europe and Asia, the US has fulfilled its traditional function as an engine of growth. The countries with a current account surplus, particularly those in Asia, in turn send the proceeds back to the US as investments, mostly in US treasury bonds. These investments help to keep US interest rates low, which in turn sustains American consumption. The imbalance goes hand in hand with huge indebtedness. At the end of year in 2003 there is America’s net financial deficit happened that amounted to nearly 30% of the country’s total output (Tran, 2004).

The dollar’s long-run prognosis is negative. In the wake of the crisis, a retrenchment in cross which had border financial flows will mean less demand for dollar which is denominated asset. And with Uncle Sam’s printing press running overtime to cover the government’s trillion dollar deficits, the currency is expected to be further cheapened (Eichengreen excerpt from Lynch 2009). The decline in the dollar’s value in the past seven months in 2009 there largely reflects an unwinding of the “light to quality” that occurred during the most panicked crisis phase. Since then, the Euro has regained the lost ground and then some. A Euro, which settled at $1.50 in the last Wednesday of November 2009 was down became $1.43 in December 2009. In the political realm, the dollar’s weakness is interpreted as a referendum on American declined (Lynch, 2009).

Singapore was the first East Asian country to fall into recession from the current global economic crisis in July 2008. It was projected that the Singapore economy worked grow by -1.0 to 2 percent in 2009. As compared to Singapore, the Hong Kong economy contracted later and only declined into a recession in the middle of November. Hong Kong is projected to grow by 2 percent in 2009 from 5.6 percent in 2007 (Regional Economic Outlook, 2008; excerpt from Thangavelu, 2008). This clearly reflects the greater vulnerability of the Singaporean economy to external conditions and global economic shocks. The economic condition in Singapore is further accentuated by the huge loss in wealth (large negative wealth effect) from the rapidly declining a Singaporean stock market from the global financial crisis, whereas the Singapore Stock Index was above 3500 points in December 2007 and as of November 2008 it was hovering at around 1700 points (Thangavelu, 2008).

ASEAN is Singapore's hinterland with a population of nearly 540 million in ASEAN-10. Thus a larger single market such as ASEAN will provide stronger economic base to ride out global shocks. The ASEAN region could play an important role in the stabilization and growth of the South-east Asian countries. Intra-regional trade in ASEAN and Asia will be one of the key factors for export growth as the key export markets in United States and European Union flattens. Intra-regional trade in Asia accounted for nearly 50 percent of the total trade in Asia in 2006. In ASEAN-10, the share of intra-ASEAN trade increased from 17 percent in 1990 to nearly 26 percent in 2005. The share of intra-regional trade among ASEAN+3 (ASEAN-10 including, China, Japan, and Korea) in 1990 was

nearly 29 percent and it increased to 39 percent in 2005. As countries are contemplating greater regulation to protect their market from financial crisis, it is imperative that ASEAN emphasize greater regional trade and integration in terms of removing trade restrictions and behind border barriers to trade. In particular, there could be a greater harmonization of technical standard and regulations within ASEAN, which allows for a greater vertical and horizontal integration of firms in the global production network (Thangavelu, 2008).

Table. 1.2
Average Annual Net FDI Flows
1980-2007

Country	Average Annual Net FDI Flows (US$, Millions)			
	1980-1989	1990-1995	1996-2001	2001-2007
Brunei	1	103	625	942
Indonesia	326	2,164	251	3,633
Malaysia	965	4,655	4,095	4.786
Philippines	318	1,028	1,367	1,737
Singapore	1,907	6,24	13,239	16.917
Thailand	515	2,004	4,702	6,844
Vietnam	6	947	1,694	2,563

Source: UNCTAD World Investment Report, 2008 (excerpt from Chaudhury, 2009)

Since ASEAN matured in the post-Bretton Woods era of financial and trade liberalization, there was a little risk of the bloc imposing externally protectionist policies. Its economic clout was small relative to the European Union (EU) and the dominant development strategy in the region was export-oriented industrialization (EOI), which had a proven track record in Japan, as well as Singapore, Hong Kong, Taiwan, and the Republic of Korea (the latter four constituting the original Asian 'tiger' economies). As Such, these economies established their major exports markets outside of ASEAN-5 and encourage extra-

ASEAN flows of foreign direct investment (FDI) to finance the current account deficits run-up through purchases of capital goods and technology needed to improve factor productivity (see Table 1.2). Apart from Singapore, the ASEAN-5 either pegged their currencies to the U.S. Dollar or maintained a managed float regime in order to create an environment conducive to investment and maintain export price competitiveness. During the boom years, the depreciating effect of consistent current account deficits on the exchange rate was offset by both FDI and portfolio investment flows as well as active intervention in the foreign exchange markets by central banks. The power of monetary authorities to maintain exchange rates within an acceptable band depended primarily on the volume of foreign exchange reserves they were willing to sacrifice in currency markets. As would later be seen however, it also depended on the credibility of the authorities committing to the exchange rate policy, as perceived by global capital markets (Chaudhury, 2009).

The current global crisis provides an ideal opportunity for ASEAN to increase its monetary and economic policy coordination in the region. The greater economic and social cooperation in ASEAN could be effective in managing systemic external shock such as the current global economic crisis and could help in providing greater economic stability in the region. In terms of economic cooperation, ASEAN could accelerate the technology transfer from more technologically advanced countries to the latecomers within ASEAN. The current global crisis could stall the development of vulnerable countries within ASEAN and widen the development gap, thereby decelerating the integration process.

ASEAN could also provide development and social support for the less vulnerable countries to maintain the pace of economic development within the region (Thangavelu, 2008).

Table. 1.3
ASEAN Intra and Extra Trade
2006

Country	Exports				Imports			
	Intra-ASEAN		Extra-ASEAN		Intra-ASEAN		Extra-ASEAN	
	Value (US$ million)	Share to Country Total (%)	Value (US$ million)	Share to Country Total (%)	Value (US$ million)	Share to Country Total (%)	Value (US$ million)	Share to Country Total (%)
BRUNEI	1,887.3	24.8	5,732.0	75.2	745.8	50.1	743.1	49.9
CAMBODIA	235.4	6.7	3,279.1	93.3	991.2	33.9	1,931.8	66.1
INDONESIA	18,483.1	18.3	82,315.5	81.7	19,379.2	31.7	41,686.3	68.3
LAOS	289.8	72.0	112.8	28.0	500.7	85.2	86.8	14.8
MALAYSIA	40,979.6	26.1	116,247.3	73.9	32,290.7	25.2	96,025.5	74.8
MYANMAR	2,149.7	61.2	1,365.0	38.8	1,174.7	55.5	940.8	44.5
PHILIPPINES	8,192.2	17.3	39,217.9	82.7	10,218.3	19.7	41,555.3	80.3
SINGAPORE	83,801.6	30.9	187,806.3	69.1	62,300.4	26.1	176,181.6	73.9
THAILAND	26,944.2	22.2	94,635.3	77.8	23,539.8	18.5	103,569.0	81.5
VIETNAM	6,214.0	16.8	30,819.7	83.2	12,453.7	31.0	27,783.1	69.0
ASEAN	189,176.8	25.2	561,531.0	74.8	163,594.5	25.0	490,503.3	75.0

Source: ASEAN Secretariat, 2006 (excerpt from Thangavelu, 2008)

The key to ASEAN Economic Community is in removing barriers to trade and investment in services. Services trade is expected to provide dynamic growth effects in the region and provide important linkage for manufacturing production networks. The liberalization of services in the region is slow and it is important to accelerate the liberalization of services in the region. A larger single market such as ASEAN will provide stronger economic base to ride out global shocks and thus the integration of ASEAN into ASEAN Economic Community will be crucial for the long term sustainable growth for Singapore and the region. The integration of

the ASEAN as a single market will provide a larger base to smooth out global shocks and increase the ability of the region to ride external shock more effectively. In this respect, the region should increase its intra-regional trade in ASEAN and Asia (Thangavelu, 2008).

The history of the yen/dollar rate over the few decades confirms the instability of major exchange rates. In the summer of 1985 the dollar was 250 yen and on the eve of the plaza Accord in September 1985, the rate was decreased to 239 and further fallen unprecedented in 1995 to 78 yen. The dollar appreciated from 78 yen in April 1995 to 148 yen in June 1998 in a period of East Asian financial crisis. The low yen shut off Japanese foreign direct investment in East Asia and close down its engine of growth (Mundell, 2003, excerpt from Choo and Choong, 2009). At the same time the rising dollar appreciated the currencies of ASEAN economies, especially Thailand, Malaysia, and Indonesia to overvalued positions that led them under the pressure of speculation. Indeed, there is strong evidence from the existing studies to support the idea that the instability of the dollar-yen exchange rates was a main factor in contributing to occurrence of the crisis (Choo and Choong, 2009).

In responding to the crisis, ASEAN heads of governments in December 1997 set out their ASEAN ‘Vision 2020’ statement. The vision contained a message in favor of moving towards closer cohesion and economic integration. It was soon followed by an action plan concluded in the following year at the ASEAN summit in Hanoi. The action plan among other things, calls for a strengthening of the financial system in the region to maintain regional

macroeconomic and financial stability, and to intensify cooperation on money, tax and other financial related matters. Prior to East Asia crisis, economic integration in East Asia has been enhancing via the market driven forces such as cross-border trade, FDI (foreign direct investment) and finance. Over the past 20 years, international trade and FDI activities have expanded rapidly through multilateral international institutions such as World Trade Organization (WTO), Asia Pacific Economic Cooperation (APEC) as well as unilateral (or multilateral) trade liberalization processes. Nevertheless, the patterns of economic cooperation in East Asian countries have been changed, especially after the East Asia financial crisis erupted in mid-1997. The rapidly changing international environment and East Asia crisis have emerged a common interest amongst East Asia countries in creating a strong impetus for regional cooperation. This has led to the Chiang Mai Initiative (CMI) agreement on bilateral swaps and discussion of the possibility of creating a monetary union among the ASEAN+3. Indeed, there have been few attempts proposed to create cooperative frameworks that help to prevent and manage future currency crises and to promote economic efficiency by developing sound financial systems. Japan, for example, has proposed to create an Asian Monetary Fund (AMF) in September 1997. The members of this Fund would contribute some portion of their international reserves to a central fund, which would be utilized to provide a financial assistance to countries affected by external crises such as financial and currency crises. However, the United States, China and the IMF against the establishment of the AMF proposal on two reasons: soft conditionality and duplication. As a further step in promoting Asian

economic integration, Japanese finance minister Miyazawa has made a proposal that is called “New Miyazawa Initiative” in October 1998, which aimed to set up a financial assistance scheme totaling 30 billion US dollars. This Initiatives, however, has met with strong criticism because the proposal is too Japan-centered, and the attitude of Japan in regional initiatives is rather ambiguous (Moon, 2000, excerpt from Choo and Choong, 2009). Although this proposals were rejected, there were few more successful initiatives had been proposed towards a closer monetary cooperation in Asian. For example, a conference was held in Manila in November 1997, which consisted of deputy finance ministers and central bank governors from 14 mostly Asian countries. The outcome of the conference was the establishment of Manila Framework Group (MFG), a new framework to enhance Asian Regional cooperation and to promote financial stability in the region. In addition, the ASEAN finance ministers agreed to establish the ASEAN Surveillance Process (ASP) in October 1998 to encourage policy dialogue based on the peer review and mutual interest among ASEAN member countries. In November 1999, China, Japan, and South Korea had been invited to join ASP, which making “ASEAN+3” reality in financial surveillance (Choo and Choong, 2009).

To reinforce the Hanoi action plan in order to achieve this goal, ASEAN nations have also moved forward by looking at a wider region in terms of economic and financial cooperation through the Chiang Mai Initiatives (CMI) that was launched in May 2000. The initiative aimed to develop a network of bilateral swap agreements (local currency to US dollar or Japanese) among Northeast

Asian countries, and strengthening an intra-ASEAN swap agreement. In May 2002, bilateral swap agreements between Japan, Korea, Thailand, Malaysia, Philippines, and China were initiated. Also the ASEAN swap agreement was extended to cover all the 10 member countries. The CMI represents the first milestone towards constructing a coordinated intervention policy and currency arrangement regionally. Nevertheless, this step is more likely to be more a case of "pooling reserve" in dealing with external instability or crises than a commitment to bilateral intervention to stabilize regional bilateral exchange rates. Obviously, financial cooperation has seen some positive progress among East Asia countries; however, incentives for monetary cooperation are still lack (Choo and Choong, 2009).

The East Asian crisis, obviously, has demonstrated the dangers of pegging exchange rates in the presence of liberalized international capital markets without the requisite political commitment (Chow and Kim, 2003, excerpt from Choo and Choong, 2009). Although Chiang Mai Initiative (CMI) present as financial and monetary cooperation between ASEAN and Japan, China, Korea commit to bilateral intervention to stabilize regional bilateral exchange rates, but however incentives for monetary cooperation are still lack. Since the introduction of the Euro as the sole currency of the European Monetary Union (EMU), the currency has became the second most important currency in the world and has been one of the most significant developments in international monetary relations in the present and future. As consequences, three-currency triad formed by the dollar, euro and yen currency areas now dominates the international monetary core. The

success of the EMU has provided a useful and convincing framework in investigating the possibility of forming a single currency area or monetary union in East Asian region generally and ASEAN economic particularly. The formation of single currency area or currency union in East Asia covers many advantages. Firstly, the existence of a common currency area is thought to be one of the main resolutions to minimize the exchange rate fluctuation that has significant impact on both macroeconomic stability and balance of payment position. Secondly, the major advantage of the union is that it facilities and promotes a greater trade and investment among the members of the union and therefore, stimulates economic growth by reducing transaction costs in cross-border activities and minimizing exchange rates volatility across the union. Finally, the union aims to strengthen economic and financial surveillance and exchange of information by hoping that the bilateral swap-arrangements and regional surveillance could beneficial crisis countries in East Asia (Choo and Choong, 2009).

The issue of financial integration in East Asia has received growing attention in recent decades. Since the beginning of the 1990s some authors started to look at issues related to monetary integration in East Asia, for example Frankel (1991,1993), Frankel and Wei (1994), Goto and Hamada (1994), Bayoumi and Eichengreen (1994). However, in the case of ASEAN nations, the issues of monetary integration was almost unimaginable, at least until the 1997-1998 financial crisis hit most of its member countries. The crisis had persuaded the ASEAN nations to think of themselves more in terms of a region, and musings about the idea of having a common currency for ASEAN surfaced (Ramayandi,

2005). Although European Monetary Union has 12 members, the total area of these countries is only 40% of total area of China, and most of which locate in the central Europe Continent and share a similar culture and economic development. But East Asia is more characterized by diversity in terms of size, levels of economic development and political and social system. Table 1.4 shows the divergence of country size and population among China, Japan, and Korea.

Table. 1.4
ASEAN Key Trade by Region
(Value in US$ million; share in percent)
2006

Partner Country/region	Value			Share to total ASEAN trade		
	Exports	Imports	Total Trade	Exports	Imports	Total Trade
ASEAN	189,176.8	163,594.5	352,771.4	25.2	25.0	25.1
JAPAN	81,284.9	80,495.6	161,780.5	10.8	12.3	11.5
USA	96,943.5	64,252.5	161,196.0	12.9	9.8	11.5
EUROPEAN UNION	94,471.8	66,118.1	160,589.9	12.6	10.1	11.4
CHINA	65,010.3	74,950.9	139,961.2	8.7	11.5	10.0
KOREA	25,670.0	26,849.7	52,519.6	3.4	4.1	3.7
AUSTRALIA	23,148.5	13,262.8	36,411.4	3.1	2.0	2.6
INDIA	18,928.1	9,774.6	28,702.7	2.5	1.5	2.0
CANADA	3,916.4	2,970.3	6,886.8	0.5	0.5	0.5
RUSSIA	1,583.0	2,841.1	4,424.1	0.2	0.4	0.3
NEW ZEALAND	3,018.6	1,531.2	4,549.8	0.4	0.2	0.3
PAKISTAN	2,986.2	296.1	3,282.4	0.4	-	0.2
Total Selected Partner countries/regions	606,138.2	506,937.5	1,113,075.7	80.7	77.5	79.2
Others	144,569.6	147,160.4	291,730.0	19.3	22.5	20.8
Total Selected Partner	750,707.8	654,097.8	1,404,805.7	100.0	100.0	100.0

Source: ASEAN Secretariat, 2006 (excerpt from Thangavelu, 2008)

Table. 1.5
Basic Characters of
China, Japan and Korea
2005

Country	Area (sq. km)	Population (million people)	Population Density (people per sq. km.)	Human Development Index (%)
China	9,598,050	1,297	135	0.525
Japan	377,800	127	336	0.943
Korea	99,260	48	484	0.707

Source: World Bank, World Develop Indicator and HDI, 2005 (excerpt from Jikang and Yin, 2005)

Table. 1.6
Basic Characters of
Germany, France and Italy
2005

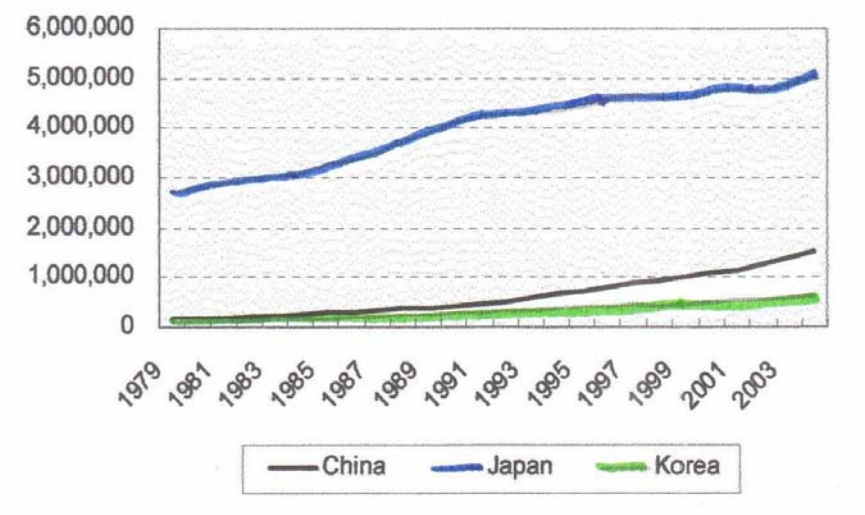
Country	Area (sq. km)	Population (million people)	Population Density (people per sq. km.)	Human Development Index (%)
Germany	357,030	82	230	0.93
France	551,500	59	107	0.93
Italy	301,340	58	191	0.92

Source: World Bank, World Develop Indicator and HDI, 2005 (excerpt from Jikang and Yin, 2005)

China is the largest country in both terms of area and population but with a relatively lowest population density of 135, while Korea is the smallest country with more than 480 people per sq. km. According to Human Development Index (2005), which indicates the level of human and economic development of a country, Japan enjoys an advanced status with a high score of 0.943 out of 1, whereas China and Korea still belong to medium level. Comparing to Table 1.6

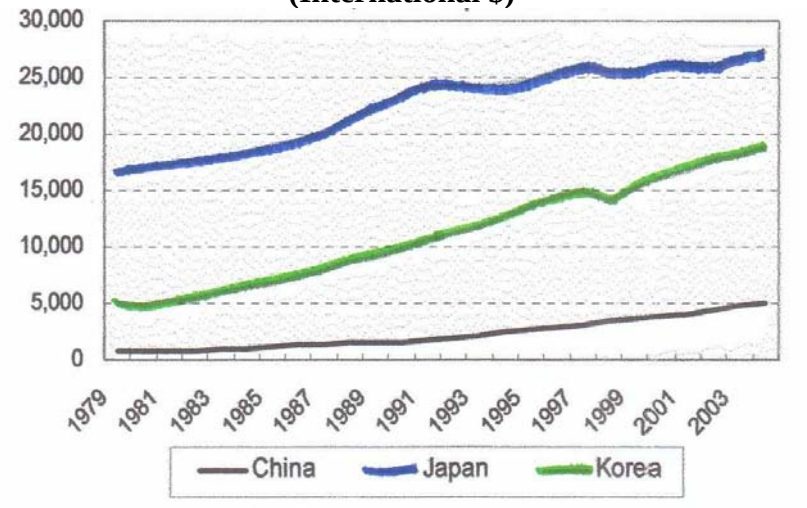
which gives the relevant information of Germany, France, and Italy, we can see that every indicator appears more harmony among EMU (European Monetary Union) members (Jikang and Yin, 2005).

Figure. 1.1
GDP
China, Japan, and Korea
1979-2004(Constant 2000)
(Million US$)



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

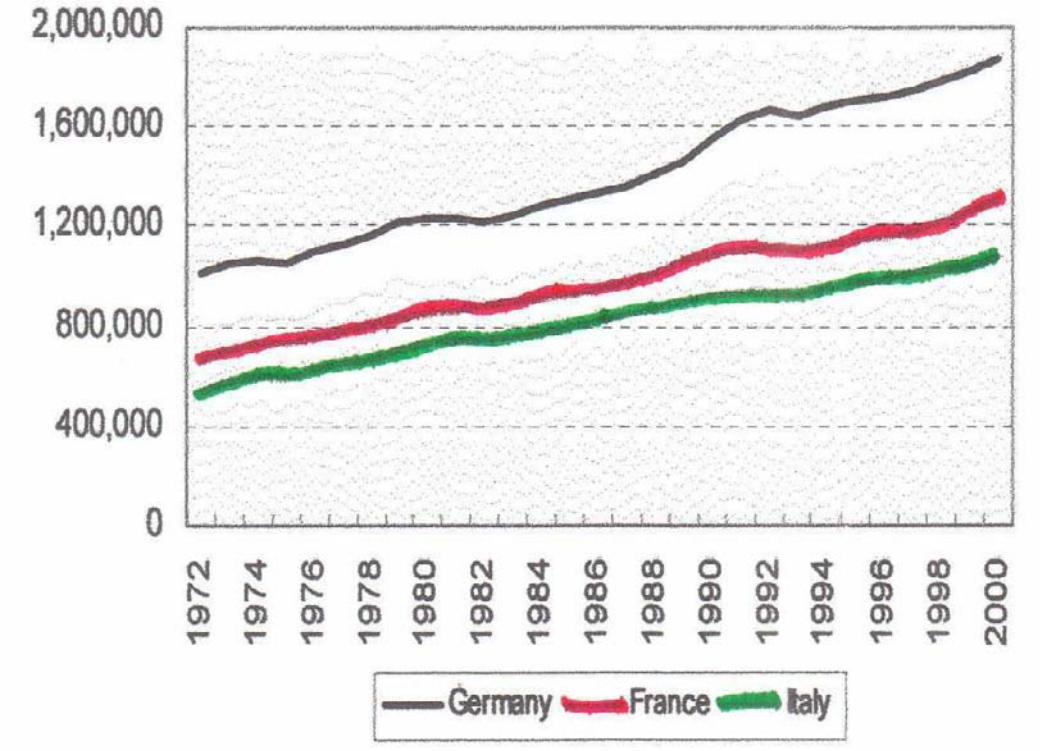
Figure. 1.2
GDP per capita PPP
China, Japan, and Korea
1979-2004(Constant 2000)
(International $)



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

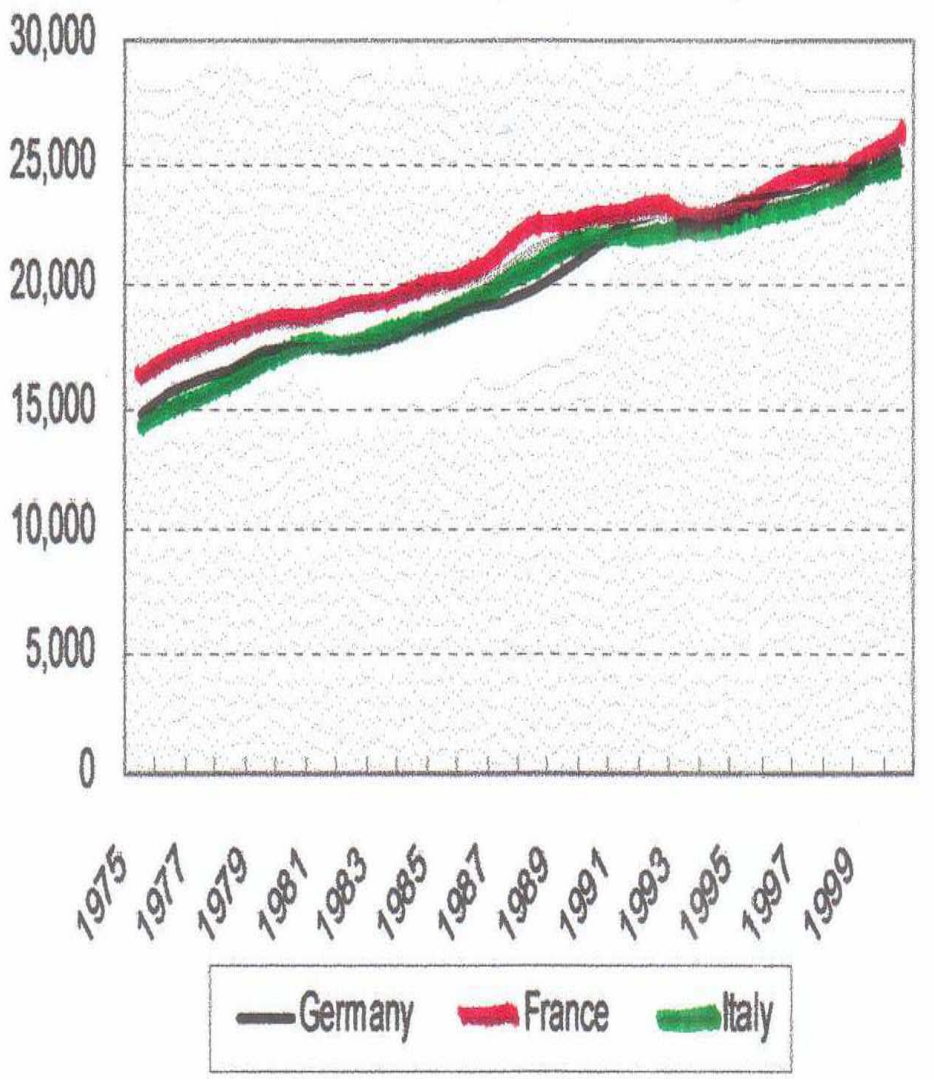
China experienced a vigorous growth since the economic reform in 1978. After more than two decades of expansion, China's gross domestic product (GDP) totaled 1,506 billion USD in 2004, which is nearly 10 times as much as that in 1979. In spite of enjoying the highest economic growth, China's GDP and GDP per capita is still far less than Japan and Korea. Figure 1.1 and 1.2 shows the huge differentials in GDP size among China, Japan and Korea. In 2004, China's GDP is 30% of the GDP of Japan, and 2 times that of Korea. But when it comes to GDP per capita, China had the bad performance among the three, which accounts for 18% of GDP per capita of Japan and 27% of Korea (Jikang and Yin, 2005).

Figure. 1.3
GDP
Germany, France, and Italy
1972-2000(Constant 2000)
(Million US$)



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

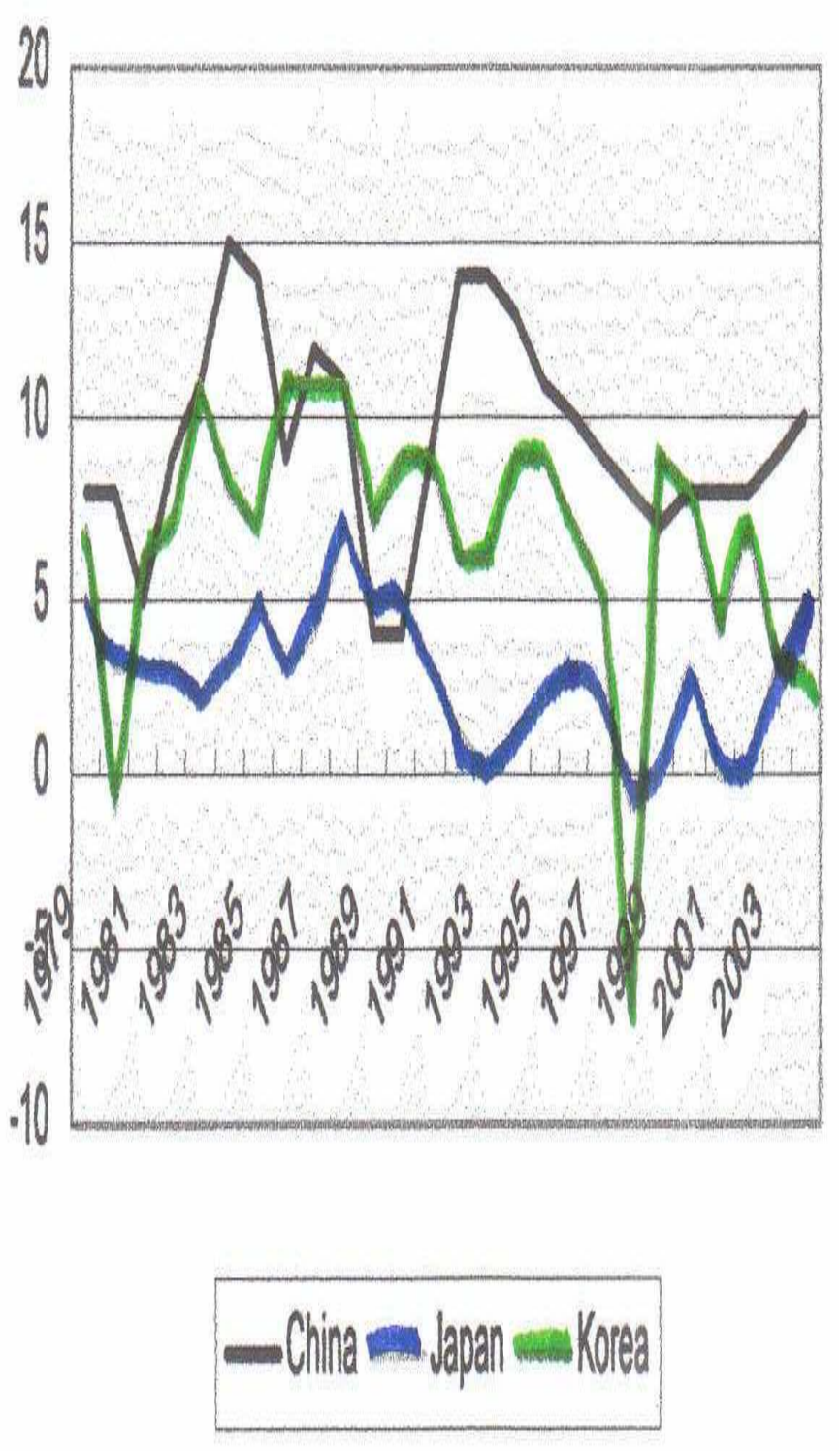
Figure. 1.4
GDP per capita PPP
Germany, France, and Italy
1975-2000(Constant 2000)
(International $)



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

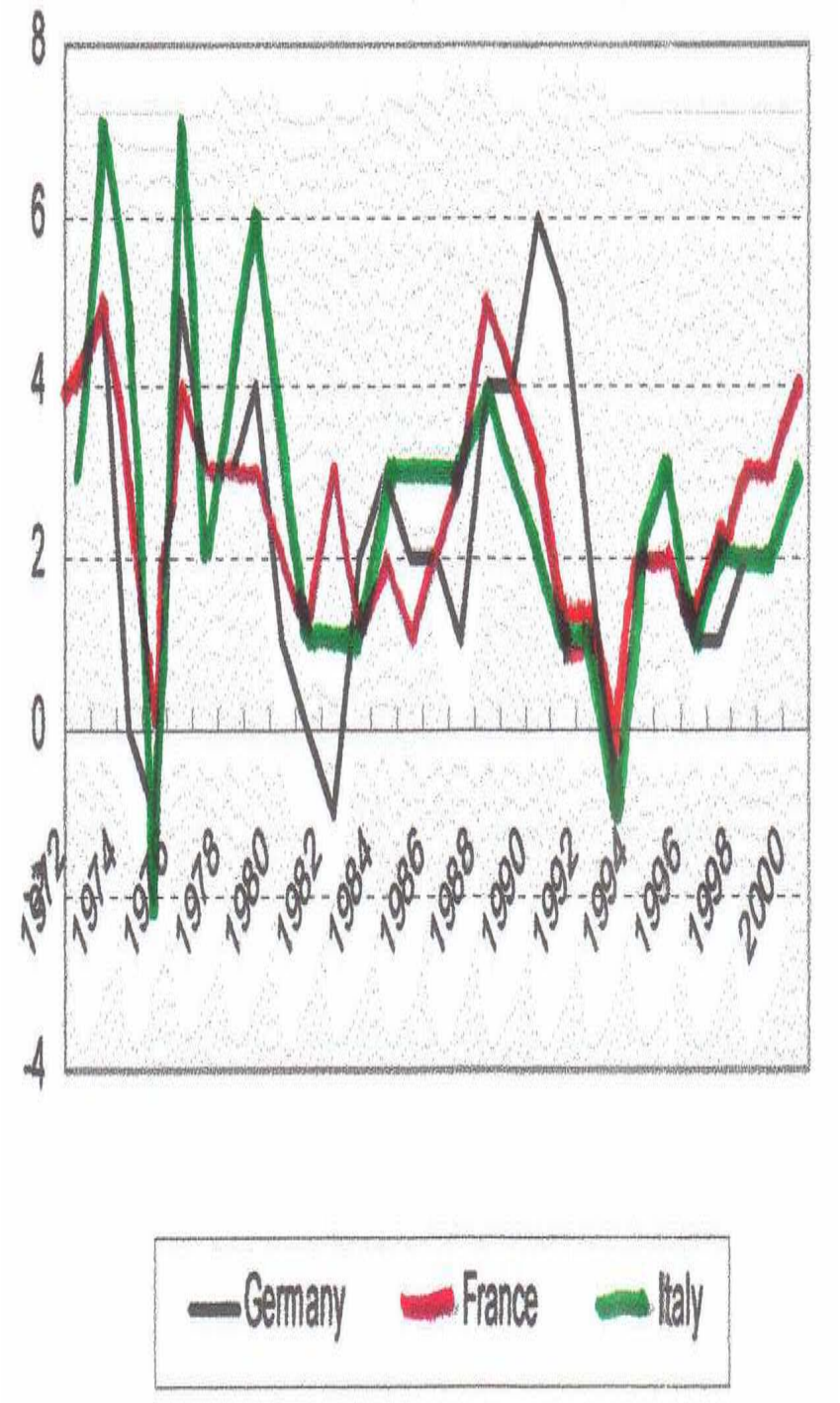
Figure 1.3 and 1.4 give the GDP size and GDP per capita of the 3 EMU members. Figure 1.2 shows a similarly ascending trend of GDP size among Germany, France and Italy, and figure 1.3 displays a coherency of GDP per capita. Comparing to those figures of China, Japan and Korea, we have to say that there is much less similarity of economic size among these East Asia countries.

Figure. 1.5
China, Japan, and Korea
GDP Growth (annual %), 1979-2004



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Figure. 1.6
GDP Growth
Germany, France, and Italy
1972-2000
(annual %)



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Table. 1.7
GDP Growth Correlation
China, Japan, and Korea
1979-2004

Country	China	Japan	Korea
China	1	-	-
Japan	-0.12	1	-
Korea	0.18	0.41	1

Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Table. 1.8
GDP Growth Correlation
Germany, France and Italy
1972-2000

Country	Germany	France	Italy
Germany	1	-	-
France	0.59	1	-
Italy	0.58	0.76	1

Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

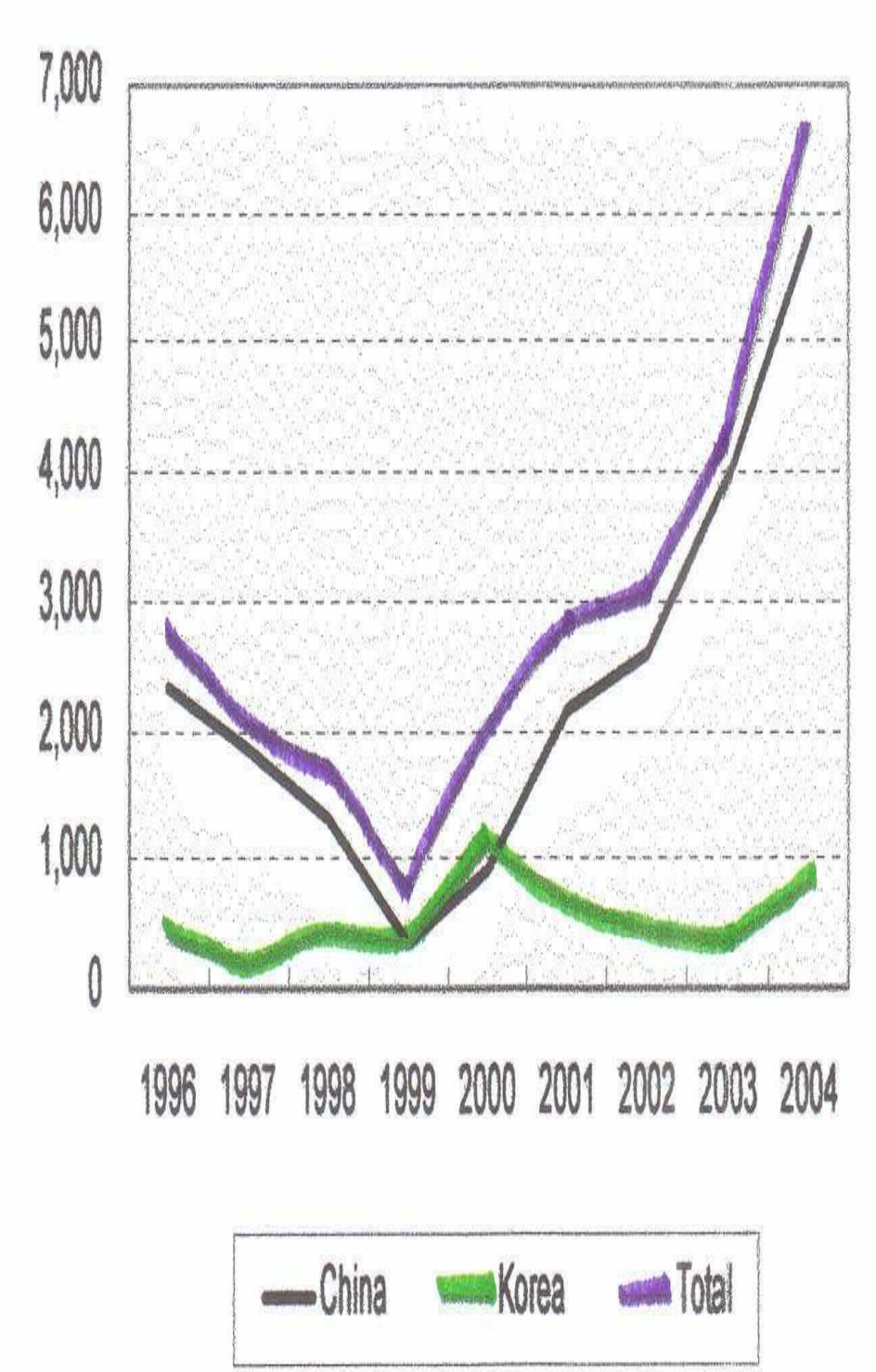
Other than GDP sizes, GDP growth patterns are different among China, Japan and Korea. Figure 1.5 illustrates the economic growth paths during the last 25 years, where China's have an average GDP growth of 9.5% while Japan 2.7% and Korea 6.7%. When we comparing them to those of EMU members (see

Figure 1.5), we have to agree to the less similarity of GDP growth among East Asia countries (Jikang and Lin, 2005). Table 1.7 and Table 1.8 contain the Pearson correlation of two groups, which give a quantitative description of different extent of GDP growth coherence. The correlation between China and Korea is only 0.18 while between China and Japan is negative. The correlation of economic growth between Japan and Korea is relatively high, but still much lower than those between Germany, France, and Italy. Labor mobility helps members of a monetary union to adjust to asymmetric shocks by allowing labor mobility varies across countries. Although the level of labor mobility is rather low in East Asia relatively to that of Europe, it had been rapidly increasing since 1990s. In 1991 there were 1.2 million foreign residents in Japan, which was less than 1% of Japan's population. Of this number, 693,100 (about 57%) were Koreans and 171,100 (some 14%) were Chinese According to data from Ministry of Justice of Japan (excerpt from Jikang and Lin, 2005), registered Chinese increased from 150,000 in 1990 to 462,000 in 2003, and registered Korean increased more than 60,000. In 2003, around 8,300 Koreans went abroad to permanently settle in a foreign country. According to government surveys of emigrants, China is the second popular destination (16.8%) and Japan the third (12.6%). Of course, currently, the degree of labor mobility is still rather low comparing to that of EMU members before their forming European Monetary Union (Jikang and Lin, 2005).

Despite relatively low level of labor mobility, capital mobility East Asia is high. Moon, 2000 (excerpt from Jikang and Lin, 2005) indicate that, in the mid-

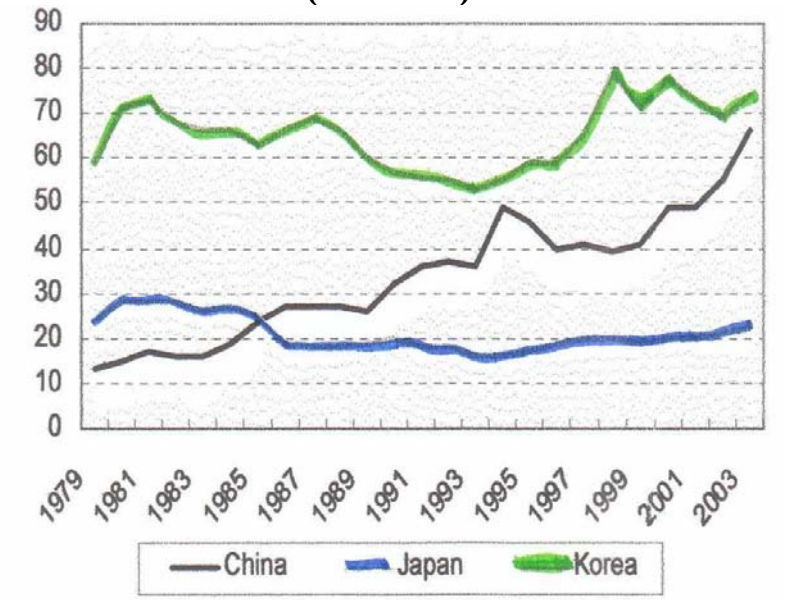
1990s, the ratio of Foreign Direct Investment (FDI) inflow to regional GDP was the highest in East Asia (1.56%), followed by the EU (1.26%), and the ratios of outflow to regional GDP show the same order: 1.74% in East Asia, 1.59% in EU. Intra-Asia FDI accounts for more than 60% of China's total FDI inflow, and the number of Japan is 7.9% in 2002 and 9.5% in 2003. South Korea's FDI to China increased even strong from 5.2% in 2002 to 8.4% in 2003. Figure 1.8 shows that Japan's FDI to China growing strongly after 1999. Trade openness indicates the extent of an economy's openness to the whole world. According to McKinnon, 1963 (excerpt from Jikang and Lin, 2005) the higher the openness levels of potential members, the lower the demand for autonomous monetary policy, and the more suitable to form a monetary union. As we can see from figure 1.8, China's trade openness increased dramatically from a little than 10% of GDP in 1979 to nearly 70% in 2004. Korea has been a high openness country in the term of trade, with a trade volume accounted for more than 50% for 25 years. Whereas Japan is more inclined to use protective trade policy, whose total trade volume has been less than 30% of GDP all these time, and came to around 20% of GDP since middle 1980s. In this aspect, China and Korea are sharing more and more similarity, with the trade openness of more than three times that of Japan, which indicates the international exposures of these three economies are quite different, and in turn may cause different performance when hit by external shocks. When we come to the trade openness of Germany, France and Italy (see Figure 1.9), we find the openness level and moving trend of these EMU members, unlike the East Asia group, are in agreeable harmony (Jikang and Yin, 2005).

Figure. 1.7
FDI Outflow
Japan
(million US$)



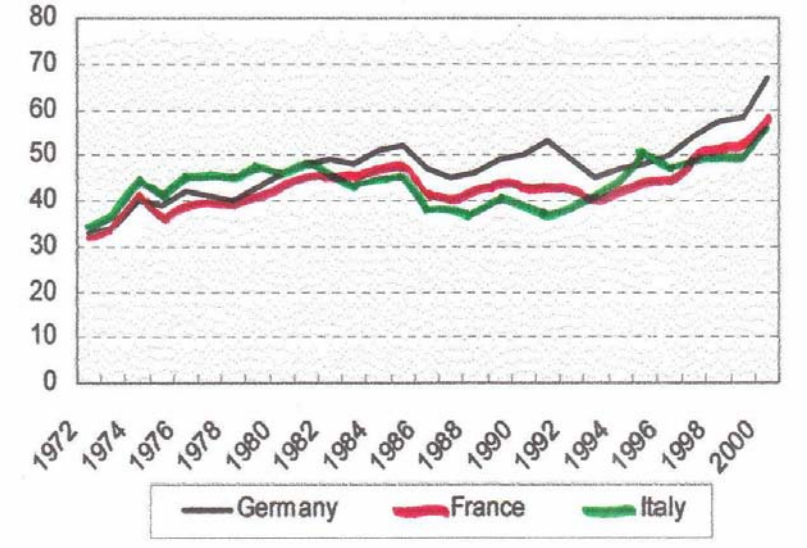
Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Figure. 1.8
Trade
China, Japan, and Korea
1979-2003
(% of GDP)



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Figure. 1.9
Trade
Germany, France, and Italy
1772-2000
(% of GDP)



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Table 1.9
Trade Intensity Index
1999

Country	China	Japan	Korea
China	0	-	-
Japan	2.5	0	-
Korea	2.7	2.5	0

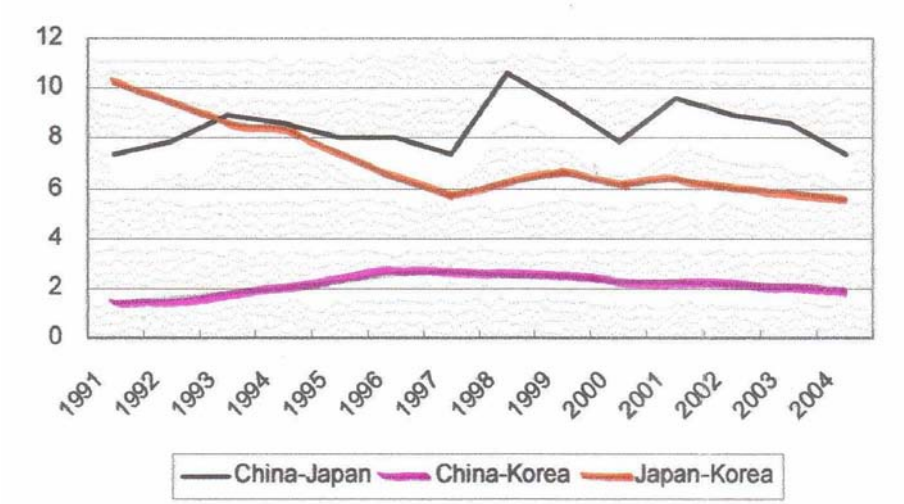
Source: Ministry of Commerce of the PRC
Statistics Bureau of Japan
Korea National Statistical office
World Trade Union database
(excerpt from Jikang and Yin, 2005)

Table 1.10
Trade Intensity Index
2004

Country	China	Japan	Korea
China	0	-	-
Japan	4.8	0	-
Korea	3.0	4.6	0

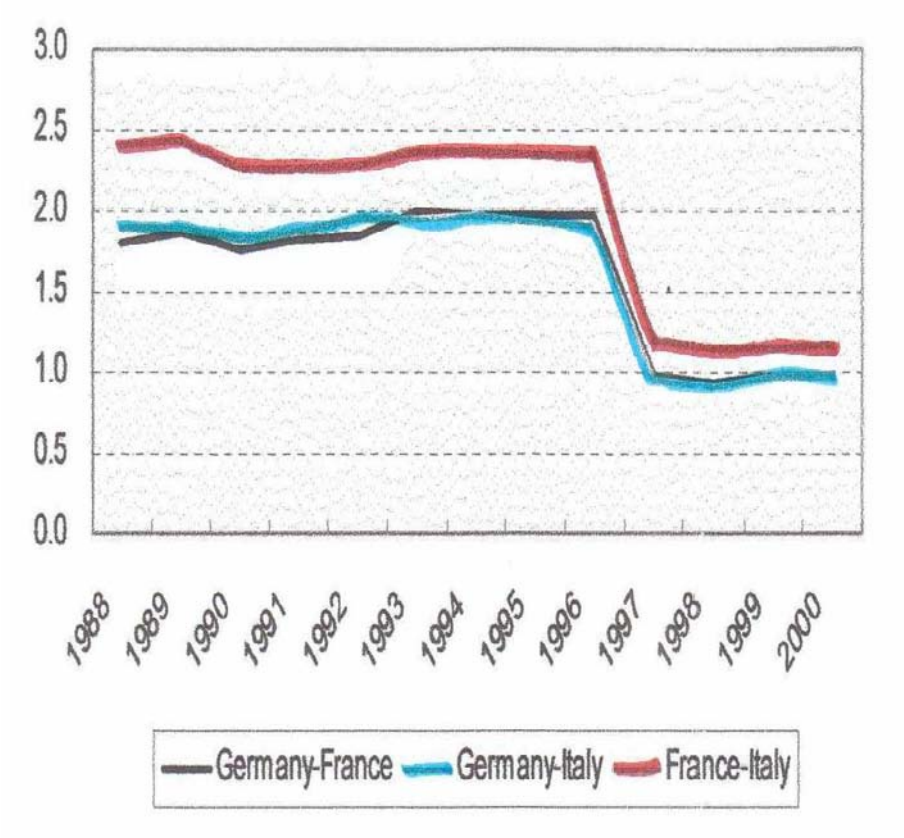
Source: Ministry of Commerce of the PRC
Statistics Bureau of Japan
Korea National Statistical office
World Trade Union database
(excerpt from Jikang and Yin, 2005)

Figure 1.10
Trade Intensity Index
China, Japan, and Korea
1991-2004



Source: Direction of Trade Yearbook, IMF (excerpt from Jikang and Yin, 2005)

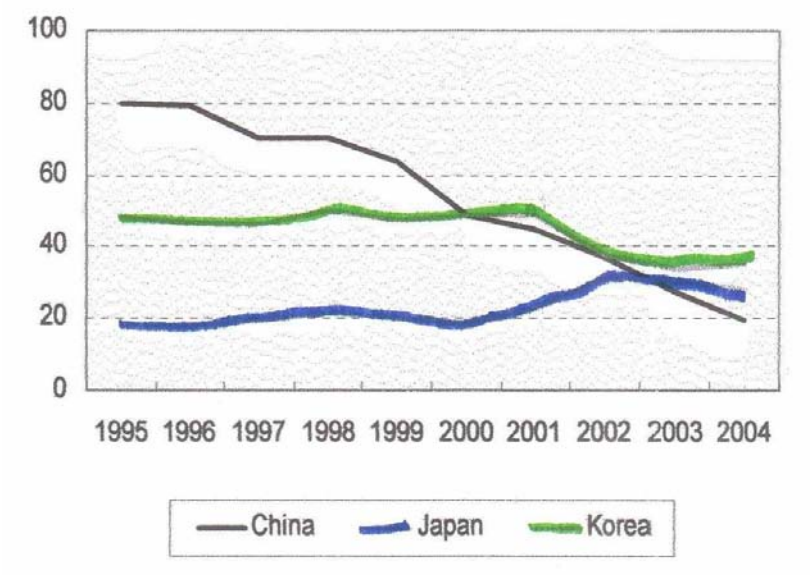
Figure 1.11
Trade Intensity Index
Germany, France, and Italy
1988-2000



Source: Direction of Trade Yearbook, IMF (excerpt from Jikang and Yin, 2005)

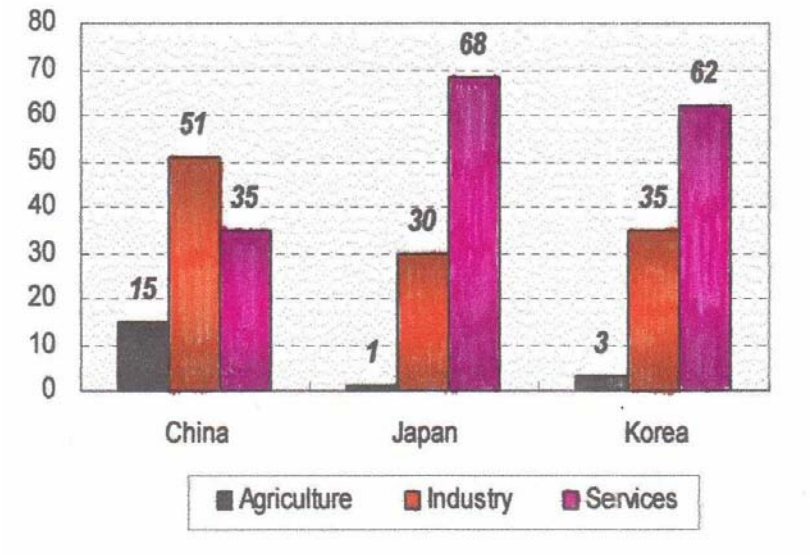
Trade intensity among China, Japan and Korea is rather high comparing to that among Germany, France and Italy. But at the same time we find the intensity is much more volatile in the East Asia group than the EU group. Of course high trade intensity indicates high interdependence between economies, which is favorable in order to form a currency union, but at the same time high fluctuation is obstacle. But at the same time, although intra-regional trade increases by numbers, all these countries were beginning to diversify their trade partners, this leads to the result of decreasing bilateral trade share among total trade that shown in Figure 1.12 (Jikang and Yin, 2005).

Figure 1.12
Bilateral Trade Share of Total Trade
1995-2004
Source:
Ministry of Commerce of the PRC
Statistics Bureau of Japan



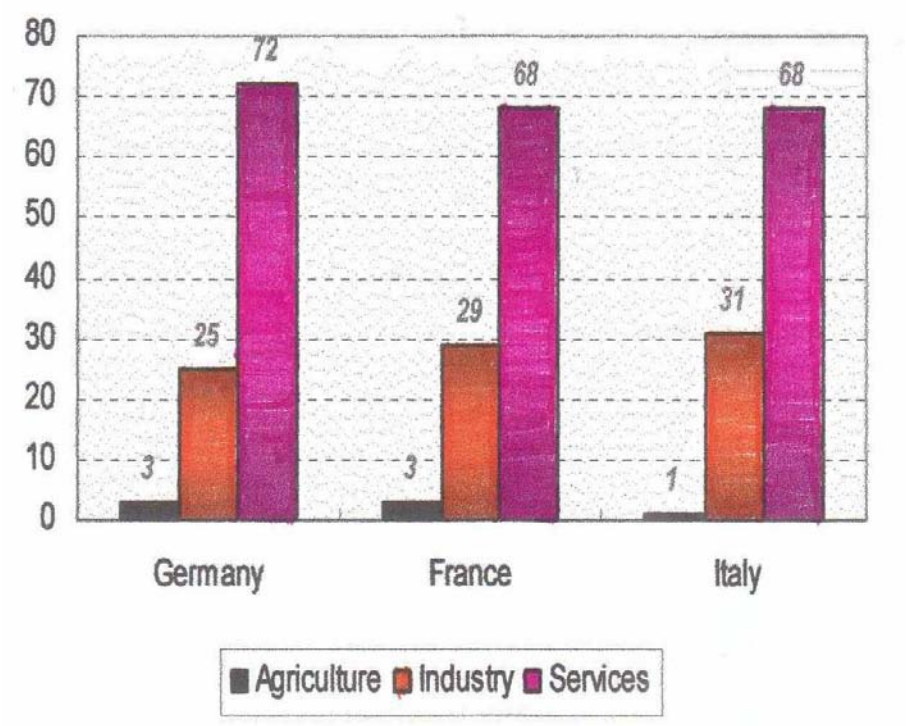
Source: Korea National Statistical Office
Ministry of Commerce of the PRC
Statistics Bureau of Japan
(excerpt from Jikang and Yin, 2005)

Figure 1.13
Structure of Output
2004
(% of GDP)



Source: World Bank, World Development and Policy (excerpt from Jikang and Yin, 2005)

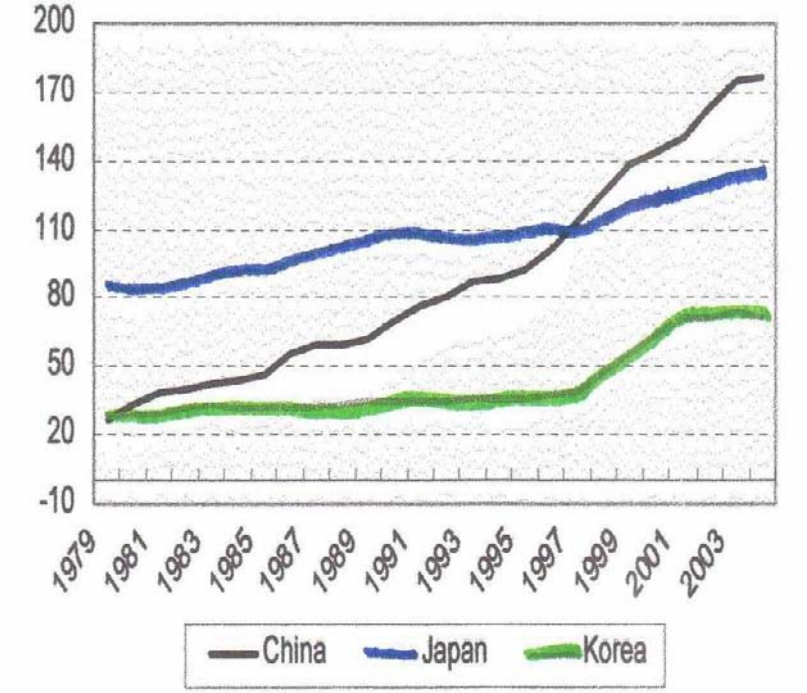
Figure 1.14
Structure of Output
2000
(% of GDP)



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Due to the difference in development stage, China's productive structural is quite different from that of Japan and Korea. Figure 1.13 shows that agriculture sector still accounts for 15% of total output of China in 2004, whereas the corresponding figure of Japan 1%, and Korea 3%. Service sector dominates Japanese and Korean economy by contributing more than 60% of GDP, while for China as the largest share comes from industrial production. Economic structure of Japan and Korea are more close to each other, but different from that of China. Comparing with figure 1.14, which illustrates the outcome structure of Germany, France and Italy in 2000, the productive structure of the latter group displayed much more similarity (Jikang and Yin, 2005).

Figure 1.15
Money and Quasi Money (M2)
China, Japan, and Korea
1979-2004
(% of GDP)



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Depth of financial development, exchange rate regime arrangement and policy monetary preference are major differences in financial aspect among the 3 countries. Figure 1.15 describes financial depth process of China, Japan and Korea. We can see that although Korea bears many similarities in other aspects with Japan, the financial depth indicator of Korea in 2004, evaluated from money and quasi money to GDP, is only half of that of Japan and 40% of China. China's M2 maintain strong growth during the past 25 years, and first excelled Japan in 1997, but this is much more because of its exchange rate policy than financial development. Table1.11 lists relevant information about differentiations in exchange rate regime and monetary policy (Jikang and Yin, 2005).

Table 1.11
Exchange Rate Arrangements and Anchors of Monetary Policy

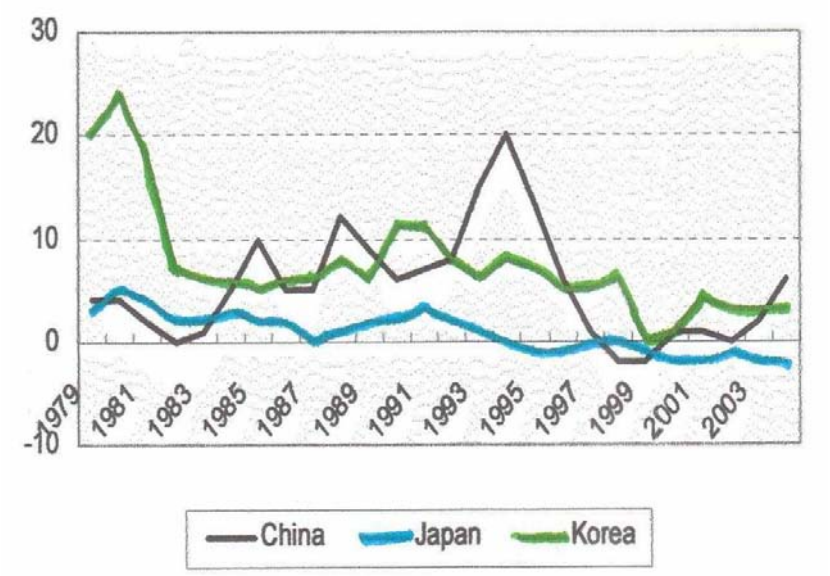
Country	**Exchange Rate Regime**	**Monetary Policy Framework**
China	De facto peg arrangement under a formally announced policy of managed of independent floating(against dollar)	Exchange rate anchor, Monetary aggregate target
Japan	Independently floating	Has no explicitly stated nominal anchor, but rather monitors various indicators in conducting monetary policy
Korea	Independently floating	Other (not specific)

Source: IMF, International Financial Statistics (excerpt from Jikang and Yin, 2005)

Inflation rates differentials will change the purchasing power of currencies of potential members disproportionably. The more convergent inflation rates are among economies, the more suitable for them to form a currency union. Here, we use GDP deflator as an indicator of inflation rate. As we can see from Figure 1.16, inflation rate fluctuated dramatically in China and Korea in the past three decades, while Japan successfully controlled inflation under 5%, but this is partly because of the stagnation of economic growth. As a contrast, inflation levels among the EMU members (see Figure 1.17) converging steadily after 1980, being controlled fewer than 5% since 1992 and below 2% in the late 1990s. Table 1.12 and Table 1.13 provide the Pearson correlation of inflation among China, Japan, and Korea, versus Germany, France and Italy. The correlation among East Asia group is

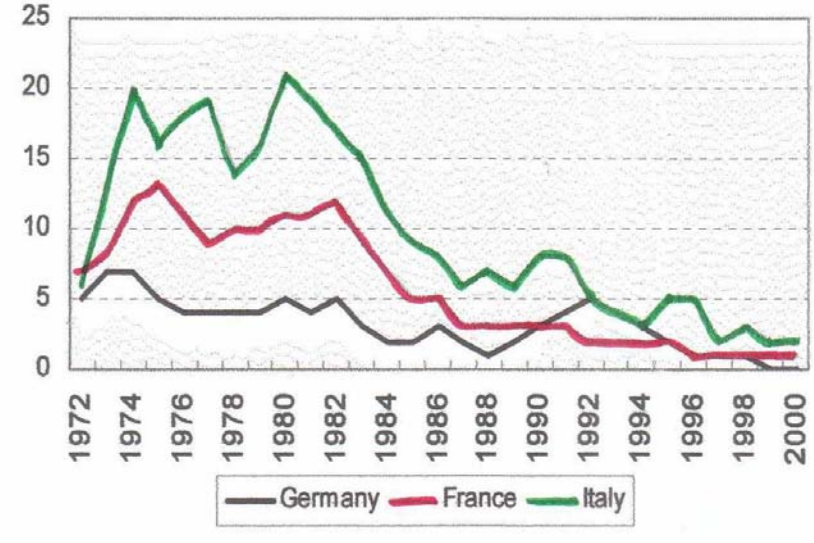
similar to the level of the EMU group, which is positive evidence for suitability of forming monetary cooperation (Jikang and Yin, 2005).

Figure 1.16
Inflation (GDP Deflator)
China, Japan, and Korea
1979-2004



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Figure 1.17
Inflation (GDP Deflator)
Germany, France, and Italy



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Table 1.12
Inflation (GDP Deflator) Correlation
China, Japan, and Korea
1979-2004

Country	China	Japan	Korea
China	1	-	-
Japan	0.69	1	-
Korea	0.998	0.70	1

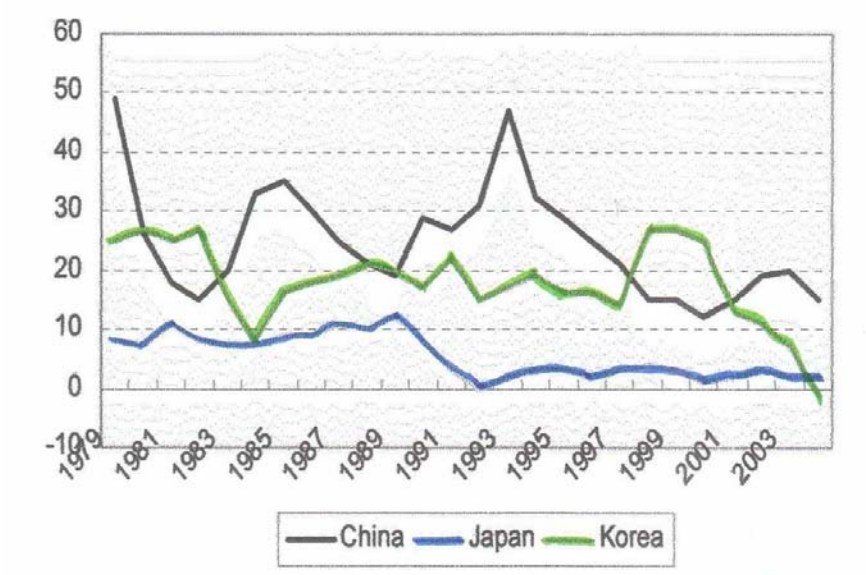
Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Table 1.13
Inflation (GDP Deflator) Correlation
Germany, France, and Italy
1972-2000

Country	Germany	France	Italy
Germany	1	-	-
France	0.71	1	-
Italy	0.67	0.95	1

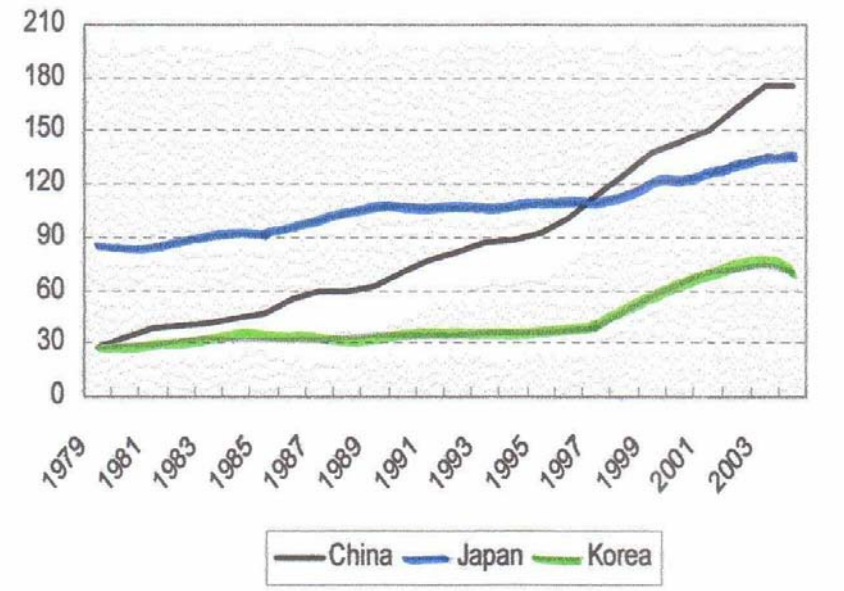
Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Figure 1.18
Money and Quasi Money Growth
China, Japan and Korea
1979-2003



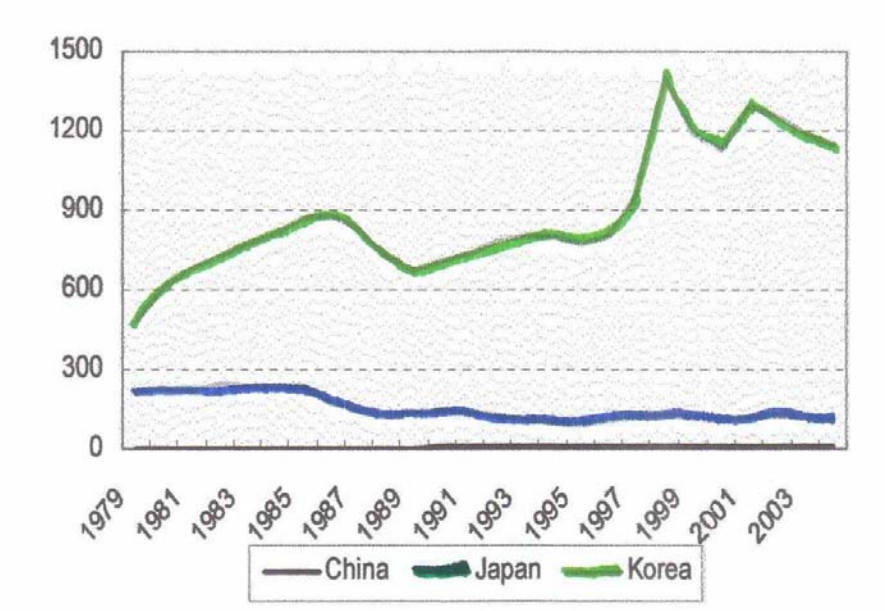
Source: World Bank; World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Figure 1.19
Money and Quasi Money
China, Japan, and Korea
1979-2003
(% of GDP)



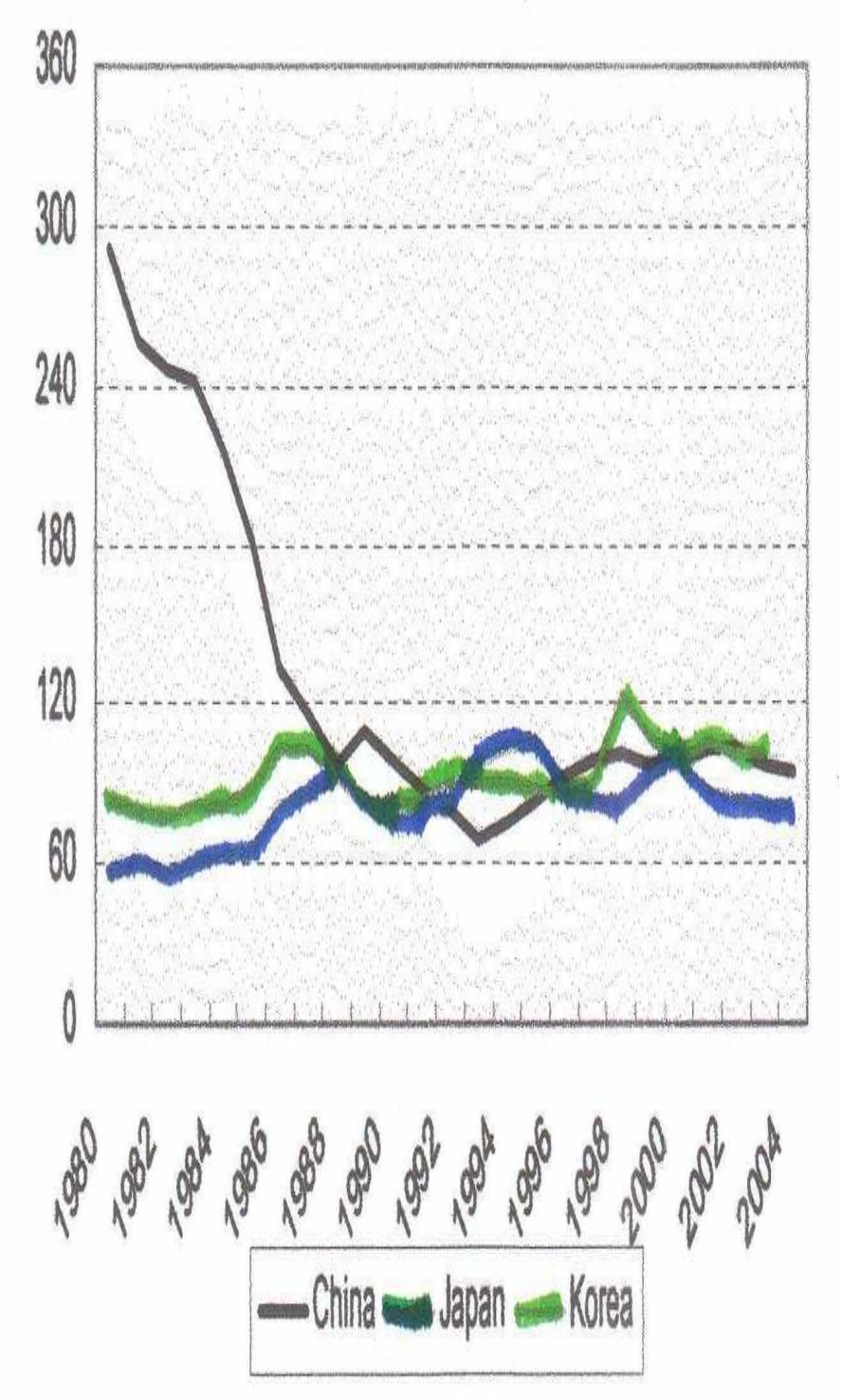
Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Figure 1.20
NER (Nominal Exchange Rate)
China, Japan, and Korea
1979-2003



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Figure 1.21
REER (Real Effective Exchange Rate)
China, Japan, and Korea
1980-2004 (2000=100)



Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Table 1.14
REER (Real Effective Exchange Rate) Correlation
China, Japan, and Korea
1979-2004

Country	China	Japan	Korea
China	1	-	-
Japan	-0.87	1	-
Korea	-0.47	0.45	1

Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Table 1.15
Descriptive of REER (Real Effective Exchange Rate)
China, Japan and Korea
1979-2004 (2000=100)

Country	Mean	Std. Deviation
China	130.92	65.06
Japan	80.73	14.29
Korea	92.45	11.00

Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Table 1.16
REER (Real Effective Exchange Rate) Correlation
Germany, France and Italy
1975-2000

Country	Germany	France	Italy
Germany	1	-	-
France	0.64	1	-
Italy	0.35	0.1	1

Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Table 1.17
Descriptive of REER (Real Effective Exchange Rate)
Germany, France, and Italy
1975-2000 (2000=100)

Country	Mean	Std. Deviation
Germany	115.42	8.24
France	109.92	6.81
Italy	105.65	8.71

Source: World Bank, World Develop Indicator 2005 (excerpt from Jikang and Yin, 2005)

Figure 1.20 and Figure 1.21 explicate the Nominal Exchange Rate (NER), vis-à-vis the US dollar, and Real Effective Exchange Rate (REER) of China, Japan, and Korea over the period of 1979-2004. The first figure shows remarkable divergence of nominal exchange rate, while the latter shows an amazing convergening trend in REER of China, Japan and Korea. But this may be an illusion since we set the REER in 2000 equals to 100. At the same time, REERs of these countries fluctuate differently during the observing period. Table 1.14 gives the Pearson correlation of REERs of East Asia group; we find that the correlation of REER is negative between China, Japan, and China and Korea; while Japan and Korea have a correlation of 0,45. We believe this lack of synchronization in REER movement is a great obstacle of forming a currency union between China and Japan and Korea. Table 1.15 also shows the volatility of REERs, among which Chinese Yuan is the least stable currency with a standard deviation of 65, which is another drawback in monetary cooperation. When comparing to the REER correlation (see Table 1.16) of Germany, France and Italy, we cannot find a strongly evidence that they share more similarity in REER movement among the

EMU members, but surely, the correlation between Germany and France, 0.64 is 40% higher than that of Japan and Korea. Table 1.17 shows the descriptions of REER historical data, where the volatilities of these currencies are greatly lower and closer to each other than those of the East Asia group (Jikang and Yin, 2005).

Table 1.18
Correlation of Real Supply Shock
China, Japan, and Korea
1980-2000

Country	China	Japan	Korea
China	1	-	-
Japan	0.09	1	-
Korea	0.12	0.42	1

Source: Ding and Li, 2005 (excerpt from Jikang and Yin, 2005)

Table 1.19
Correlation of Real Supply Shock
Germany, France and Italy
1980-2000

Country	Germany	France	Italy
Germany	1	-	-
France	0.31	1	-
Italy	0.62	0.5	1

Source: Ding and Li, 2005 (excerpt from Jikang and Yin, 2005)

Table 1.20
Correlation of Real Demand Shock
China, Japan, and Korea
1980-2000

Country	China	Japan	Korea
China	1	-	-
Japan	0.18	1	-

Korea	0.60	0.41	1

Source: Ding and Li, 2005 (excerpt from Jikang and Yin, 2005)

Table 1.21
Correlation of Real Demand Shock
Germany, France, and Italy
1980-2000

Country	Germany	France	Italy
Germany	1	-	-
France	0.44	1	-
Italy	0.44	0.32	1

Source: Ding and Li, 2005 (excerpt from Jikang and Yin, 2005)

Table 1.22
Correlation of Monetary Shock
China, Japan, and Korea
1980-2000

Country	China	Japan	Korea
China	1	-	-
Japan	-0.12	1	-
Korea	0.09	-0.06	1

Source: Ding and Li, 2005 (excerpt from Jikang and Yin, 2005)

Table 1.23
Correlation of Real Supply Shock
Germany, France and Italy
1980-2000

Country	Germany	France	Italy
Germany	1	-	-
France	0.67	1	-
Italy	0.67	0.46	1

Source: Ding and Li, 2005 (excerpt from Jikang and Yin, 2005)

Table 1.18 to Table 1.23 display correlations of real supply shock, real demand shock and monetary shock among East Asia group and EMU member

group. Real supply shock correlation and real demand shock correlation between Japan and Korea is close to those among EMU members, however the correlation between China and Japan and China and Korea show less symmetry. As far as monetary shock correlation is concerned, we find China, Japan and Korea still have a long process to go in order to reach the precondition of OCA criteria. Monetary shock correlation between China and Japan and Japan and Korea is negative; the correlation between China and Korea is less than 0.1 whereas the correlations among EMU members are 0.67 and 0.67 and also 0.46 during 1980-2000 (Jikang and Yin, 2005).

From Jikang and Yin (2005) research result, we can comprehensively examine the economic suitability for forming a monetary union within China, Japan and Korea, the three major economies in East Asia. We can also compare the many economic indicators stressed by OCA theories of China, Japan, and Korea over the period of 1979 to 2004 to that of Germany, France and Italy from 1972 to 2000. This research found that capital mobility is high, intra regional trade is intensive between China, Japan and Korea, but economic development, productive structure, financial development, and exchange rate correlation, comparing to those of the three EMU members, East Asia group are less favorable to OCA criteria. This research also compare the correlation of real supply shock, real demand shock and monetary shock between two groups; that founded the correlation between Japan and Korea is close to those among EMU members in terms of real supply shock and real demand shock, but the economic adjustment mechanisms to monetary shock bear great difference and correlations among the

three East Asia country is extremely low. Therefore Jikang and Yin (2005) believe China, Japan and Korea are less ready for a monetary cooperation than Europe was in terms of economic conditions.

The trade intensity index between the five ASEAN economies in Table 1.24 shows that each country (except for the Philippines and Indonesia) has been intensively trading with the others. In most cases, the trade intensity index figures also show an increasing trend and the highest value of the index is found in the case of trading with Singapore. Those trends indicate the tendency that recently the five ASEAN economies are trading more intensively among themselves. Over the period 1996–2001, Indonesia experienced an increase in the trade intensity index with its four neighboring trade partners. The most dramatic trade intensity increase occurred in the case of trade with Malaysia (about 79 per cent increase), while the lowest increase occurred in the case of trade with Thailand (about 22 per cent). In most cases, the trade intensity improvement peaked in 1998 and slows down a bit in the following years. Malaysia's case is similar to that of Indonesia. Here, the most dramatic increase in trade intensity occurred in the case of trade with Indonesia (about 88 percent), while the lowest occurred in the case with Thailand (about 7 per cent). Singapore and Thailand share similar patterns in terms of trends of their trade intensity with the neighboring economies. Both experienced the most dramatic increase in trade intensity index with the Philippines (about 83 per cent for Singapore and about 93 per cent for Thailand), while both also experienced a slow-down in trade intensity between each other (about -11 per cent for Singapore and -17 per cent for Thailand). It is noteworthy;

however, that both Singapore and Thailand have been trading very intensively with each other throughout the period under consideration.4 Philippines, on the other hand, shows a slightly different pattern from its neighbors. Although it reciprocates the trade intensity with Singapore (the index increase by about 60 per cent over the period), it does not do so in the case of Indonesia. The trade intensity index for the Philippines with Indonesia decreases by about 3.5 per cent over the period, and its magnitude also suggests that Philippines is not intensively trading with Indonesia at this time. Table 1.24 also shows that trade complementarily acts as a relatively strong driver behind this more intensified trade in the region. All the economies in the region show a magnitude of trade complementarily index - that is above one. This suggests that those economies are relatively 'matched' in terms of trade commodity compositions. An exception, however, is evident in the case of Indonesia. The magnitude of this index almost always lies below one in all cases. Therefore, in this instance, the increasing intensity of trade between Indonesia and its neighboring economies is not being driven by the matching of trade commodity composition, but rather by something else. As also evident from Table 1.24, the biggest contributor for the highly intensified trade in all cases comes from the trade bias effect. In all cases, the bias component plays a large role in increasing the trade intensity within the region (all figures for this index are larger than one). As mentioned earlier, this effect depends on various items like transport costs and the existence of discriminatory trade policies. It seems that the signing of AFTA and the 1997–98 financial crises are among the driving

factors behind this trade bias effect. This bias effect in trade may be of particular importance in explaining the increasing intensity of trade between Indonesia and

Table 1.24
Trade Indices for ASEAN countries
1996-2001

Country	Year	Indonesia			Malaysia			Philippines			Singapore			Thailand		
		B	C	I	B	C	I	B	C	I	B	C	I	B	C	I
Indonesia	1996	0	0	0	2.94	0.51	1.50	2.41	0.85	2.05	4.53	0.78	3.53	2.73	0.52	1.43
	1997	0	0	0	3.01	0.60	1.81	3.02	0.70	2.11	5.70	0.73	4.14	2.05	0.68	1.40
	1998	0	0	0	3.90	0.68	2.65	3.68	0.68	2.52	8.40	0.72	6.00	3.16	0.79	2.51
	1999	0	0	0	3.61	0.65	2.36	3.26	0.69	2.26	6.97	0.71	4.95	2.40	0.79	1.89
	2000	0	0	0	3.57	0.70	2.51	2.69	0.94	2.52	6.43	0.76	4.90	2.18	0.79	1.73
	2001	0	0	0	3.72	0.72	2.68	2.95	0.96	2.84	6.64	0.74	4.93	1.98	0.88	1.75
Malaysia	1996	2.63	0.70	1.85	0	0	0	1.32	1.33	1.76	4.70	1.69	7.96	3.08	1.14	3.52
	1997	2.95	0.69	2.05	0	0	0	1.42	1.48	2.10	4.83	1.71	8.25	2.77	1.13	3.13
	1998	4.55	0.60	2.71	0	0	0	1.57	1.73	2.70	4.91	1.84	9.01	3.22	1.26	4.05
	1999	6.62	0.51	3.39	0	0	0	1.27	1.89	2.40	4.50	1.85	8.35	3.05	1.20	3.64
	2000	6.12	0.54	3.30	0	0	0	2.21	1.50	3.32	4.97	1.76	8.73	3.11	1.22	3.78
	2001	5.93	0.59	3.48	0	0	0	1.78	1.58	2.83	5.07	1.75	8.89	3.07	1.23	3.77
Philippines	1996	1.66	0.51	0.84	1.27	1.80	2.28	0	0	0	1.37	1.72	2.36	3.08	1.08	3.33
	1997	2.22	0.51	1.12	0.92	1.98	1.82	0	0	0	1.41	1.91	2.69	2.58	1.17	3.01
	1998	1.88	0.40	0.75	1.27	2.89	3.68	0	0	0	1.43	2.34	3.34	1.74	1.60	2.78
	1999	1.37	0.26	0.35	1.61	2.43	3.89	0	0	0	1.84	2.20	4.04	1.90	1.31	2.49
	2000	2.70	0.34	0.93	1.11	2.62	2.90	0	0	0	1.68	2.34	3.94	2.23	1.51	3.35
	2001	2.20	0.37	0.81	1.15	2.55	2.93	0	0	0	1.68	2.26	3.79	2.98	1.41	4.21
Singapore	1996	n.a	n.a	n.a	7.03	1.69	11.88	2.01	1.32	2.65	0	0	0	3.62	1.33	4.83
	1997	n.a	n.a	n.a	7.08	1.72	12.15	2.18	1.51	3.28	0	0	0	3.27	1.21	3.96
	1998	n.a	n.a	n.a	7.05	2.03	14.32	2.03	1.88	3.80	0	0	0	3.73	1.32	4.91
	1999	n.a	n.a	n.a	7.05	2.03	14.30	1.86	2.04	3.80	0	0	0	3.83	1.27	4.88
	2000	n.a	n.a	n.a	6.61	2.16	14.25	2.73	1.67	4.55	0	0	0	3.17	1.39	4.42
	2001	n.a	n.a	n.a	6.95	2.08	14.44	2.84	1.71	4.84	0	0	0	3.29	1.30	4.29
Thailand	1996	2.20	1.09	2.40	2.78	1.15	3.20	1.59	1.13	1.79	3.94	1.31	5.16	0	0	0
	1997	3.50	0.81	2.82	2.63	1.17	3.07	1.56	1.09	1.70	3.72	1.21	4.51	0	0	0
	1998	2.56	1.47	3.77	2.56	1.23	3.15	1.56	1.57	2.44	3.87	1.22	4.72	0	0	0
	1999	1.88	2.06	3.88	2.63	1.21	3.19	2.14	1.16	2.49	3.63	1.21	4.40	0	0	0
	2000	3.76	0.99	3.71	2.55	1.28	3.26	2.70	1.10	2.97	3.40	1.23	4.17	0	0	0
	2001	4.93	0.83	4.11	2.85	1.24	3.52	2.92	1.18	3.45	3.63	1.18	4.27	0	0	0

Source: STARS, International Economic Data Bank (excerpt from Ramayandi, 2005)
Note:
I = Trade Intensity Index

C = Complementary Index
B = Trade Bias Index

its neighboring trade partners. In summary, in addition to any economic causes, the increasing trade intensity in ASEAN also seems to be supported by some institutionalized agenda to move towards a more integrated region. Therefore, if the picture from the recent development in the trade patterns in ASEAN continues, then the region may be able to capture the extra benefit of reduction in transaction costs and improvement in price transparency by forming a currency union (Ramayandi, 2005).

An examination of the correlation coefficients for the aggregate supply shocks in ASEAN during 1960–1996 (just a year before the crisis started) suggests that the aggregate supply shocks across the five ASEAN nations are mostly not significantly correlated. Significant correlation is found for the cases of

Table 1.25
Correlation of Aggregate Supply Shocks across the ASEAN Nations

	Indonesia	Malaysia	Singapore	Thailand	Philippines
Aggregate Supply Shocks (1960-1996)					
Indonesia	1.00	0	0	0	0
Malaysia	0.38*	1.00	0	0	0
Singapore	0.16	0.36*	1.00	0	0
Thailand	0.25	0.28	0.38*	1.00	0
Philippines	-0.08	-0.02	-0.05	0.08	1.00
Aggregate Supply Shocks (1960-2002)					
Indonesia	1.00	0	0	0	0
Malaysia	0.78*	1.00	0	0	0
Singapore	0.40*	0.56*	1.00	0	0
Thailand	0.46*	0.63*	0.45*	1.00	0
Philippines	0.20	0.25	0.17	0.32*	1.00

Source: Pacific Economic Papers, 2005 (excerpt from Ramayandi, 2005)
*: Significance at 5% level

Indonesia and Malaysia, Malaysia and Singapore, and Singapore and Thailand (see Table 1.25). The correlation between Malaysia and Thailand appears to be marginally significant. Although there are some significant correlations, the magnitude of the correlation coefficients itself are not particularly high. Those magnitudes are relatively low compared to the one for Western Europe for the period of 1969–1989. Regardless of the explanation behind such changes, the figures from Table 2 suggest that the region is now moving towards having more synchronized aggregate supply shock elements. As suggested by the theory of OCA, similarities in supply shocks plays a more important role in analyzing the economic disturbances. This then suggests that, based on this particular criterion, the five ASEAN economies (with some qualifications in the case of the Philippines) are now in a position to consider the possibility of introducing a more integrated monetary system (Ramayandi, 2005).

Table 1.26 illustrates the magnitude of the correlation coefficients for the aggregate demand shocks in the five ASEAN economies. Except for the case of the Philippines, aggregate demand shocks in the five ASEAN countries look relatively synchronized, both before and after the post-crisis period. Those shocks were positively and significantly correlated within the region, with a relatively high magnitude. The pattern does not seem to change at all even after considering the post-crisis period. Although the correlation between aggregate demand shock in Indonesia and the Philippines ceases to be significant at the 5 per cent level under the sample for 1960–2002, it is still marginally significant at 10 per cent level. One interesting pattern that can be observed from Table 1.26, however, is

that after expanding the series of observations, the magnitude of the Philippines aggregate demand correlation with the rest of the group tends to become lower. A possible explanation is that the impact of the 1997–98 crises on the Philippines is somewhat different from the other countries considered. The demand shocks essentially capture both the components of macro-policy shocks and the public preference shocks in private demand behavior. Relatively high and significantly positive correlation in the aggregate demand for the five economies, then suggests that the demand side behavior of those economies not only tends to be highly correlated but also evolved similarly over the observed period. In other words, the overall preferences on the demand side of those economies have already been closely and positively correlated during the period under consideration (Ramayandi, 2005).

Table 1.26
Correlation of Aggregate Demand Shocks across the ASEAN Nations

	Indonesia	Malaysia	Singapore	Thailand	Philippines
Aggregate Demand Shocks (1960-1996)					
Indonesia	1.00	0	0	0	0
Malaysia	0.79	1.00	0	0	0
Singapore	0.60	0.59	1.00	0	0
Thailand	0.40	0.49	0.63	1.00	0
Philippines	0.42	0.47	0.44	0.17	1.00
Aggregate Demand Shocks (1960-2002)					
Indonesia	1.00	0	0	0	0
Malaysia	0.71	1.00	0	0	0
Singapore	0.59	0.52	1.00	0	0
Thailand	0.56	0.56	0.67	1.00	0
Philippines	0.28	0.32	0.45	0.16	1.00

Source: Pacific Economic Papers, 2010 (excerpt from Ramayandi, 2005)
*: Significance at 5% level

Table 1.27
Correlation of Exchange Rates per US dollar for Five ASEAN Nations

	Indonesia	Malaysia	Singapore	Thailand	Philippines
Indonesia	1.00	0	0	0	0
Malaysia	0.91	1.00	0	0	0
Singapore	0.91	0.92	1.00	0	0
Thailand	0.88	0.93	0.93	1.00	0
Philippines	0.83	0.81	0.93	0.89	1.00

Source: Pacific Economic Papers, 2005 (excerpt from Ramayandi, 2005)
*: Significance at 5% level

Table 1.27 highlights a very high, positive and statistically significant correlation between each country exchange rate with respect to the US dollar. Indeed, the crisis period is the main contributor for such a high correlation.

Table 1.28
Correlation of Exchange Rates to US dollar for Five ASEAN Nations

	Indonesia	Malaysia	Singapore	Thailand	Philippines
Indonesia	1.00	0	0	0	0
Malaysia	n.a	1.00	0	0	0
Singapore	0.76	n.a	1.00	0	0
Thailand	0.81	n.a	0.77	1.00	0
Philippines	0.33	n.a	0.45	0.61	1.00

Source: Pacific Economic Papers, 2005 (excerpt from Ramayandi, 2005)
*: Significance at 5% level

However, even when one only considers the correlation of those countries exchange rates from the beginning of 2000, a highly positive correlation is still evident as shown in Table 1.28. This suggests that during the period under consideration, ASEAN currencies move similarly with respect to the US Dollar. The patterns, again, leaves some room for the harmonization of policies. The above account provides some analytical support for the proposition that the five ASEAN economies can move forward in integrating their monetary systems.

However, as mentioned in the previous section, the five countries are facing disparities in the level of economic development. This issue may act as a natural stumbling block for any monetary integration process. Together with the relatively weak performance in meeting the political preconditions for forming an OCA, relative economic divergence can become the main potential impediment in realizing an ACU or any other kind of monetary arrangement in ASEAN. With such differences in the level of economic development, the participating countries may always be tempted to deviate from the aim of the agreed arrangement. This potential problem will be a lot more serious in the absence of strong political commitment in the background. Increasing interest in closer monetary cooperation in ASEAN is mainly driven by the common perception of a need to stabilize the exchange rates within the region. The issue starts to emerge right after the enormous currency crisis in 1997 and has been present as a topic of lively discourse since then. On the practical side, however, the discourse is not yet making an impressive progress. Apart from the potential impediment in the form of relative economic divergence, this situation also resulted from the relatively low level of political drive to move forward in each of the member country (Ramayandi, 2005).

Ramayandi (2005) found that, Indonesia, Malaysia, Singapore, Thailand and the Philippines appear to be relatively suitable to form a monetary union. This can be justified on least two grounds: the trade pattern among these economies, and the relative symmetry in the nature of their economic shocks. These five countries will potentially reap sizable benefits from having a cooperative

monetary policy, or even from a common currency. Similarities in the recent pattern of demand shock components and exchange rate variations among them also suggest that the harmonization process in terms of macroeconomic policies may not be as hard as previously thought.

The correlation matrix of Table 1.29 that shown below does however provide some evidence to suggest that a future ASEAN OCA might work best if it starts by including only the countries with at least a rough measure of business cycle synchronization. Given the significant values, such a bloc might initially be composed of Singapore, Indonesia, Malaysia, and Thailand (Chaudhury, 2009).

The evidence for ASEAN-7 suggests a fair degree of convergence with regards to inflationary movements, as shown in Table 1.30 below (Chaudhury, 2009).

Table 1.29
Real GDP Growth Correlation in ASEAN-7
1980-2007

	Brunei	**Indonesia**	**Malaysia**	**Philippines**	**Singapore**	**Thailand**	**Vietnam**
Brunei	1	0	0	0	0	0	0
Indonesia	-0.0622	1	0	0	0	0	0
Malaysia	0.1188	0.8162***	1	0	0	0	0
Philippines	0.1219	0.2039	0.3687*	1	0	0	0
Singapore	-0.0308	0.5802***	0.8423***	0.4525**	1	0	0
Thailand	0.0108	0.8096***	0.7432***	0.2267	0.5892***	1	0
Vietnam	0.2346	0.1776	0.3324	0.0599	0.1665	-0.1068	1

Source: The Michigan Journal of Business, 2007 (excerpt from Chaudhury, 2009)
* : Significance at 10% level
** : Significance at 5% level
*** : Significance at 1% level

Table 1.30
Inflation Correlation Matrix
1980-2007

	Brunei	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Brunei	1	0	0	0	0	0	0
Indonesia	-0.3007	1	0	0	0	0	0
Malaysia	0.1955	0.3378*	1	0	0	0	0
Philippines	0.3374*	0.0354	0.3371*	1	0	0	0
Singapore	0.4558**	-0.0789	0.7607***	0.3577*	1	0	0
Thailand	0.2602	0.2882	0.7314***	0.165	0.8041***	1	0
Vietnam	0.0601	-0.1628	-0.3549*	-0.0672	-0.1944	-0.1219	1

Source: The Michigan Journal of Business, 2007 (excerpt from Chaudhury, 2009)
* : Significance at 10% level
** : Significance at 5% level
*** : Significance at 1% level

Table 1.31
Total Labor Productivity, Average Annual Growth Rate (%)

	1991-1995	1995-2000	2000-2005
Brunei	0	0	0
Indonesia	6.3	-1.6	3.5
Malaysia	6.6	0.8	2.8
Philippines	0	2.3	0.9
Singapore	6.4	2	2.3
Thailand	7.4	0.2	3
Vietnam	6.3	4.2	4.8

Source: UNESCAP Statistic Division (excerpt from Chaudhury, 2009)

Table 1.31 shows that labor productivity has seen impressive gains over the years, though it can be argued that better targeted investment, particularly in education, where much of ASEAN lags behind the Asian tigers, could raise the gains several-fold. In the words of Chaudhury (2009),

While it is not entirely realistic to think that an ASEAN monetary union is likely to be implemented anytime soon, it is well worth considering the region's suitability for greater policy coordination in the wake of the AFC and the onset of the global economic crises. The analysis conducted in this paper considers only one of a variety of macroeconomic issues relevant to a comprehensive discussion of a common currency. It finds that OCA (Optimum Currency Area) eligibility within ASEAN-7 is the highest it has been in its history, but because there is no single framework by which to evaluate the costs and benefits of a monetary union, it is still too soon to reach a definitive conclusion regarding its suitability. The uncertain economic times ahead however merit discussion on how further integration could help the organization maintain economic stability while raising its regional competitive profile. The study finds that while significant reforms can be made in the absence of such a union, there are likely to be considerable benefits that apply only after full integration takes place.

The adoption of a common currency by ASEAN is formidable, the long-run goal of a common currency for the region may be worth considering seriously, especially because, judged by the criterion of optimum currency area, the region is as suitable for the adoption of a common currency as Europe was prior to the Maastricht Treaty (Madhur, 2002).

The Maastricht Treaty of 1991 stipulated that the transition to the final stage of monetary union was conditional on a number of "convergence criteria", the designers of the treaty clearly thought that the main danger was that fiscal policy may indirectly put pressures on monetary policy. For instance, if a country got into trouble servicing its debt, the central bank might be led to ease monetary policy to lower the treasury's interest costs and prevent a financial crisis. The stability and growth pact was aimed at minimizing that danger in Europe (Masson and Patillo, 2004(excerpt from Assessing Regional Integration in Africa (ARIA III), 2008). European Monetary System (EMS) report that, in 1989, set the blueprint for monetary unification emphasizing the choice of a gradual and institutional progression toward the introduction of a single currency: monetary

union seen as the ‘crowning’ of a convergence process. The Maastricht Treaty organized this step-by-step process by imposing the famous ‘convergence criteria’ that were supposed to prepare future member countries for the uniform, ‘one-size-fits-all’ monetary policy of the European Central Bank (Cacheux, 2009).

Bayoumi and Mauro, 1999 (excerpt from Krawinee, 2003) have said that it may be easier to integrate countries that have a similar level of economic development. However, ASEAN nations are very different economically, Lim, 2000 (excerpt from Krawinee, 2003) has pointed out that ASEAN countries are dotted with Internet-savvy professional, competent managers, surgeons, and engineers, and yet at the same time, a large number of cultivators and subsistence farmers exist in every country in Southeast Asia. This occupational diversity is not found in Europe. Not only do occupational levels vary widely, GDP per capita also has a wide range across the ASEAN region. In 2000, Singapore (the highest income country in the region) had a GDP per capita that was 167 times greater than that of Myanmar (the lowest income country). By comparison, the same ratio of extremes was a mere 2.4 in the EU (European Union) region in 1994, when the Maastricht Treaty convergence criteria took place. According to the World Bank’s classification of economies by income (Global Development Finance 2002) (excerpt from Krawinee, 2003): Cambodia, Indonesia, Laos, Myanmar, and Vietnam fall into the low-income category, the Philippines, Thailand, and Malaysia are classified in the middle-income group; and only Brunei and Singapore are in the high-income group. These marked differences make it more difficult to have a smooth process in forming a currency union. The disparities in

income could lead to instability in both politics and economics. In the past, authors have conducted studies on the feasibility of a single currency for ASEAN by examining different criteria. Bayoumi and Eichengreen, 1994 (excerpt from Krawinee, 2003), Goto and Hamada, 1994 (excerpt from Krawinee, 2003), and Ngiam and Yuen, 2001 (excerpt from Krawinee, 2003), for example, looked at the symmetric and asymmetric shocks (Krawinee, 2003). The study by Ngiam and Yuen, 2001 (excerpt from Krawinee, 2003) also looked in depth at the issue in terms of labor mobility, exchange rate policy, and political will in East Asia. Yuen, 2001 (excerpt from Krawinee, 2003) used a structural vector auto regression analysis to look at the symmetric shocks. However, not many studies have used economic convergence modeling techniques to examine the prospects of having a common currency area in ASEAN (Krawinee, 2003). In addition, as is well-known, the 'convergence criteria' that were eventually included in the Maastricht Treaty were uniform, and were all about nominal convergence, in a very specific sense: exchange-rate stability, inflation-rate convergence toward the lowest ones, long-term, nominal interest-rate convergence also toward the lowest ones, and the famous public finance criteria (Cacheux, 2009).

Based on all the fact that were described above, this study will apply convergence criterion by using panel data cross-country standard deviations of; Consumer Price Indices (CPI), Real Exchange Rate in US dollars (RER), Growth rates of Foreign Exchange Reserves (GFER), Growth rates of Real Volume of Trade (GRVT), Growth rate of Real Relative Volume of Trade (GRRVT), Growth rates of Per Capita Real GDP at factor cost (GRYPC). The six economic

indicators as the focus of this study that were describe above were selected on the basis of EMU (Europe Monetary Union) standards for forming a currency union (Pitchford and Cox, 1997 (excerpt from Rasheed and Ahmed, 2007)). Consumer price indices (CPI) in this research means as an inflationary indicator that measures the change in the cost of a fixed basket of products and services, including; housing, electricity, food, and transportation. Consumer price indices is also mean as an index of prices used to measure the change in the cost of basic goods and services in comparison with a fixed base period, which is also called, cost-of-living-index. Real exchange rates in US Dollar (RER) in this research means as the price of one currency expressed in terms of U.S. Dollar which is adjusted for inflation. Growth rates of foreign exchange reserves (GFER) in this research means as the amount of increase a deposit of a foreign currency of other countries as assets allow government to keep their currencies stable and reduce the effect of economic shocks. Growth rates of real volume of trade (GRVT) in this research means as the amount of increase the number of shares, bonds or contracts, traded during a given period, for a security, or an entire exchange that adjusted for inflation. Growth rate of a real relative volume of trade (GRRVT) in this research means the amount of increases a measurement of one investment or financial instruments value relative to another's in the number of shares, bonds, or contracts which is, traded during a given period for a security or an entire exchange that adjusted for inflation. Growth rate of real per capita GDP at factor cost (GRYPC) in this research means as the amount of increase an approximation of the value of goods produced per person in the country's GDP divided by the

total number of people in the country at the total money, time and resources of a firm engaged in the business of financing accounts receivable which is the activity known as factoring with a purchase or activity that adjusted for inflation. The results of all economic indicators above can be used to examine the region's suitability for forming a single currency area (Rasheed and Ahmed, 2007).

This research paper attempts to investigate the feasibility and prospect of forming a common currency area in ASEAN countries. Quite different from previous studies of Chaudhury (2009) that observed the readiness of Seven ASEAN countries through OCA (Optimum Currency Area) criteria, this research attempts to observe Ten ASEAN countries through convergence model. However, not many studies have used economic convergence modeling techniques to examine the prospects of having a common currency area in ASEAN (Kraiwinee, 2003). The focus of the study on six economic indicators that have been explained above to form the feasibility of common currency area in ASEAN countries by observing 1992-2009 time period for overall economic indicators except GFER indicator which was observed 1992-2007 time period. It is because Brunei Darussalam governance officially, has not published foreign exchange reserves in 2008 and 2009 (Australian Government; Department of Foreign Affairs and Trade, 2010). This study estimation is used a panel data approach which refers to Islam, 1995 (excerpt from Young, Higgins and Levy, 2004). Regression tool that we will use is Eviews-6, is because it allow us to estimate panel equations (Eviews-6 User Guide, 2007). It is crucial that we differentiate the method of the

study from the previous study of Chaudhury (2009), because we found out from EMU study by Kenen (2002) research in which the conclusion said;

> 'In its original form, OCA (Optimum Currency Area) theory does not tell us much about the macroeconomic costs of entering into a monetary union. That is because it dealt chiefly with the effects of entering into a simple currency union under conditions of low capital mobility and was, in that context, rightly concerned with the costs of forgoing recourse to exchange-rate changes as the first-best way to deal with expenditure-switching shocks-those we would describe today as asymmetric industry-specific shocks. It paid no attention whatsoever to the most prominent feature of a full-pledged monetary union-the introduction of a single monetary policy. Although we need still to worry about the ability of individual countries to cope with structural change, we no longer count on exchange-rate changes to facilitate that process. Instead, we stress the need for more flexible labor markets within individual countries and for improving the quality of the labor force itself. (EMU study by Keenan, 2002).'

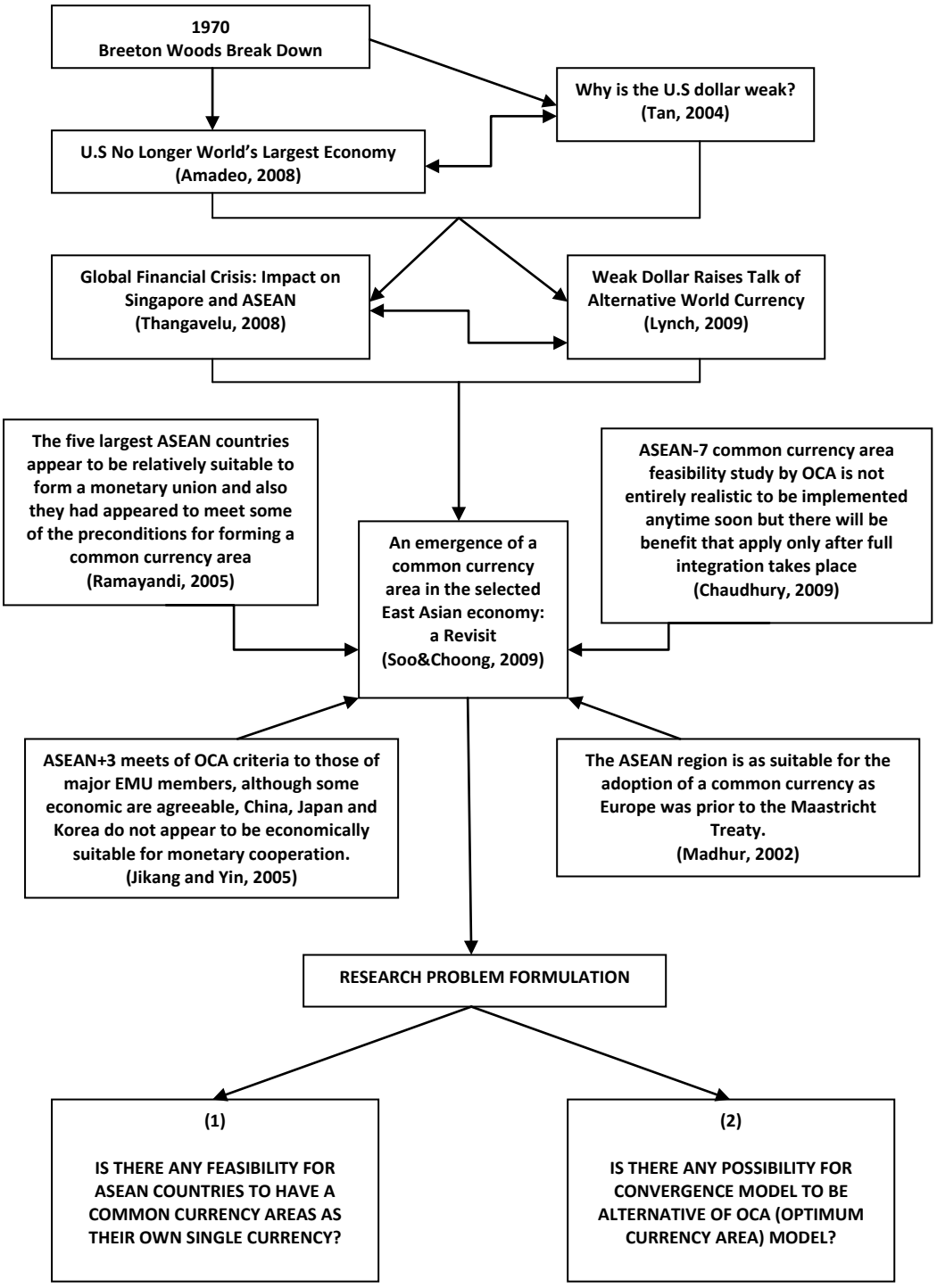
Because of that reason above, there are no reasons for this study to follow the previous study of Chaudhury (2009) which used OCA, and latter we finally decide that it is better to use Convergence criterion with their whole advantages and benefits.

This paper contributes to the literature in the following aspects. First, this study examines the feasibility in term on prospect, of economic integration through common currency area by convergence criteria (Rasheed and Ahmed, 2007). Second, This research develops the advanced or further research from previous studied that observed ASEAN-7, which suggests for advance study that cover full integration of Southeast Asian countries (Chaudhury, 2009). Third, This paper also takes into account the impact of East Asian financial crisis in 1997-1998 and Global financial crisis in 2007-2008, both of the historical crises combined become one in each of the time period observation in this figure, so there will be a comprehensive figure both of historical effect and impact to each

economic indicators that have been observed in the correlation with the feasibility of ASEAN-10 to create a common currency area in the future.

1.2 Research Problem Formulation

Figure 1.22
Research Problem Formulation



1.3 Objectives and Contribution of the Study

The objectives of the research are:

1. To apply the convergence criteria to evaluate the prospect of common currency area in ASEAN-10, consisting of; Indonesia, Malaysia, Singapore, Thailand, Philippines, Laos, Brunei Darussalam, Cambodia, Myanmar, Vietnam.
2. To investigate the feasibility of ASEAN-10 common currency area through six economic indicators through time period 1992-2009 for almost all economic indicators, except GFER that were only available in 1992-2007 because officially Brunei Darussalam government did not publish foreign exchange reserves in 2008 and 2009 (Department of Foreign Affairs and Trade of Australian Government, 2010), the six economic indicators are;
    a. CPI : Consumer Price Indices
    b. RER : Real Exchange Rate in US dollars
    c. GFER : Growth rates of Foreign Exchange Reserves
    d. GRVT : Growth rates of Real Volume of Trade
    e. GRRVT : Growth rates of Real Relative Volume of Trade
    f. GRYPC : Growth rates of Per Capita Real GDP at factor cost

This study will contribute:

1. This study examines the feasibility in term on prospect, of common currency area by convergence criteria, in which not many studies have

used economic convergence modeling techniques to examine the prospects of having a common currency area in ASEAN (Kraiwinee, 2003).

2. This research develops an advanced or further research from previous studied that observed ASEAN-7, which suggests for advance study that covers a full integration of Southeast Asian countries (Chaudhury, 2009).
3. This paper also takes into account the impact of East Asian financial crisis in 1997-1998 and Global financial crisis in 2007-2008, both of the historical crises combined become one in each of the time period observation in this figure, so there will be a comprehensive figure both of historical effect and impact to each economic indicators that have been observe in the correlation with the feasibility of ASEAN-10 to create a common currency area in the future.

1.4 Research Outlines

CHAPTER I **INTRODUCTION**

This chapter provides general introduction on this topic. It is divided into four parts; Background of the Study, Research Problems Formulation, Objectives and Contribution of the Study, Research Outlines.

CHAPTER II **LITERATURE REVIEW**

This chapter presents the Grand Theory and Prior Studies, Conceptual Framework, Hypothesis.

CHAPTER III **DATA AND METHODOLOGY**

This chapter explains the Research Variables and Operational Definition, Population and Samples, Type of Data and Sources, Method of Collecting Data, Method of Analysis.

CHAPTER IV FINDINGS AND ANALYSIS

This chapter presents the results of this study. It is divided into four parts; Description of Research Object, Data Analysis, Result Interpretation.

CHAPTER V CONCLUSIONS, LIMITATIONS, AND FUTURE RESEARCH AGENDA

This chapter provides the Conclusion, Limitations and Future Research Agenda.

CHAPTER II

LITERATURE REVIEW

2.1 Grand Theory and Prior Studies

2.1.1 Grand Theory of Economic Convergence

Economic convergence is but one dimension of the European integration process and, although it may in many respects be deemed quite successful, it has gone through various setbacks and detours, even after the launching of the European monetary union. European Monetary System (EMS) report that, in 1989, set the blueprint for monetary unification emphasizing the choice of a gradual and institutional progression toward the introduction of a single currency: monetary union seen as ‘crowning’ of a convergence process. The Maastricht Treaty organized this step-by-step process by imposing the famous ‘convergence criteria’ that were supposed to prepare future member countries for the uniform, ‘one-size-fits-all’ monetary policy of the European Central Bank (Cacheux, 2009).

The Maastricht Treaty of 1991 stipulated that the transition to the final stage of monetary union was conditional on a number of “convergence criteria”, and that a country could join the union only if:

1. Its inflation rate is not more than 1.5 percent higher than the average of three lowest inflation rates among the EU member States;
2. Its long-term interest rate is not more than 2 percent higher than the average observed in these three low-inflation countries;

3. It has joined the exchange rate mechanism of the EMS and has not experienced a devaluation during the two years preceding the entrance into the union;
4. Its government budget deficit is not higher than 3 percent of its GDP (if it is, it should be declining continuously and substantially and come close to the 3 percent norm, or alternatively, the deviation from the reference value (3 percent) should be exceptional and temporary and remain close to the reference value); and
5. Its government debt should not exceed 60 percent of GDP (if it does, it should diminish sufficiently and approach the reference value 60 percent at a stationary pace) De Grauwe, 2005(excerpt from Assessing Regional Integration in Africa (ARIA III), 2008).

The designer of the treaty clearly through that the main danger was that fiscal policy many indirectly put pressures on monetary policy. For instance, if a country got into trouble servicing it debt, the central bank might be lead to ease monetary policy to lower the treasury's interest costs and prevent a financial crisis. The stability and growth pact was aimed at minimizing that danger in Europe (Masson and Patillo, 2004 (excerpt from Assessing Regional Integration in Africa (ARIA III), 2008)).

The idea of convergence in economics (also sometimes known as the catch-up effect) is the hypothesis that poorer economies' per capita incomes will tend to grow at faster rates than richer economies. As a result, all economies should eventually converge in terms of per capita income. Developing countries

have the potential to grow at a faster rate than developed countries because diminishing returns (in particular, to capital) aren't as strong as in capital rich countries. Furthermore, poorer countries can replicate production methods, technologies and institutions currently used in developed countries. In the economic growth literature the term "convergence" can have two meanings however. The first kind (sometimes called "sigma-convergence") refers to the catch up effect between countries described above. "Beta-convergence" on the other hand, refers to a single country converging to its own steady state long run growth rate (*www.wikipedia.com*).

Convergence is a concept that has gained popularity among economists, not only because of the importance of the issue about poor countries catching up with rich ones, but also because this analysis can serve as a way to verify the validity of different growth models. Convergence is a process that may be analyzed from various aspects. Real convergence describes the convergence of income levels, nominal convergence reflects the convergence of price levels, and institutional convergence implies harmonization of legislation. In addition one can also speak about the convergence of business cycles, consumer behavior, social stratification, and so on. In the convergence literature this is known as the absolute or unconditional convergence hypothesis, Convergence in terms of both growth rate and income level is called β (beta) convergence. Beta-convergence is typically tested by regressing the growth measured as gross domestic product (GDP) per capita purchasing power parity (PPP) on the initial relative level across a cross-section of countries (regions). The name of this type of convergence is

derived from the coefficient of the initial income variable in these regressions (β) and is supposed to be negative if the hypothesis holds (Varblane and Vahter, 2005).

Barro and Sala-i-Martin (1995) and Sala-i-Martin (1996) (excerpt from Young, Higgins & Levy, 2004) draw a useful distinction between two types of convergence in growth empirics: σ-convergence and β-convergence (Young, Higgins and Levy, 2004). When the dispersion of real per capita income across a group of economies falls over time, there is σ-convergence. When the partial correlation between growth in income over time and its initial level is negative, there is β-convergence (Young, Higgins and Levy, 2004). Two main approaches are used to quantify the extent to which the growth process is leading to convergence or divergence in regional performance overtime. The traditional approached which is referred as to "sigma" convergence and the neo-classical approach known as the "beta" convergence. The "sigma" convergence measures the dispersion of real per capita income or product between regions based on the standard deviation of the cross-section series. When the standard deviation tends to fall over time, such a result indicates that the differences of the per capita income between regions in absolute terms decrease with the passage of time, which is an evidence of convergence. On the other hand, divergence implies that the standard deviation of the series in terms of per capita income increase over time. In the case where the standard deviation does not show any clear tendency, but instead, increases or decreases alternatively, we can say that a mixed process of convergence and divergence is taking place. An alternative way of measuring

the “sigma” convergence is to use the coefficient of variation which is obtained by dividing the standard deviation of the series by the mean of the sample. Similarly, a decreasing value of the coefficient of variation over time reflects regional convergence, an increasing value reflects divergence, and a no stable tendency is taken as evidence of both, convergence and divergence during the period in consideration. The “beta” convergence of the neo-classical approach is obtained by a regression analysis estimating the growth of per capita income of a certain period of time on the initial level of per capita income. The regression coefficient “beta” with a negative sign indicates that regions with a lower initial level of per capita income grow more rapidly than regions with a higher initial level of per capita income (Marques and Soukiazis, 1998).

In Barro and Sala-i-Martin, 1991 (excerpt from Kraiwinee, 2003), adding regional dummies and additional explanatory variables yielded greater stability in the results. Mankiw, Romer and Weil, 1992 (excerpt from Kraiwinee, 2003) also found a better fit for the regression after adding rates of investment, population growth, and human capital. Islam, 1995 (excerpt from Kraiwinee, 2003) used a panel data approach and compared the findings with those of Mankiw, Romer, and Weil, 1992 (excerpt from Kraiwinee, 2003). In general, Islam’s outcome is similar in spirit to that found by Mankiw, Romer, and Weil, 1992 (excerpt from Kraiwinee, 2003) and other researchers: the inclusion of control variables leads to higher rates of convergence.

Though intuitive simple, convergence is in effect a multidimensional and polymeric concept. Even the common sense notion of converging is usually

associated with double meaning of getting closer, and becoming more similar, in some or all relevant dimensions. Most economists would probably agree that, as a first approximation, it refers to a process in which levels of aggregate indicators of national economic performance are getting closer. Even this broad definition could clearly be questioned on the grounds that, in a single market, national aggregates may have little meaning, and also that commonly used aggregates, such as gross domestic product (GDP) or consumer price indices (CPI) are subject to very severe limitations. In practice though, convergence often refers to percentage rates of change, rather than levels, implying that the latter will never converge. Looking at the nature of those aggregates that are supposed to coverage, a further distinction arises between nominal, real, and structural convergence. The latter, probably the most elusive in terms of precise definition and measurement, would mean that the structures of national economies are becoming more and more similar, which is probably true in a very broad sense when looking at processes of economic development: in terms of composition of production, for instance, developed countries do look very much alike. Nominal convergence is about monetary and financial indicators: usually, the notion is used in the context of monetary policy objectives, referring to inflation rates and or nominal interest rates, but may also include indicators of the public sector's financial situation. By contrast, real convergence is commonly associated with a situation in which per capita real incomes and or living standards are getting closer, meaning that per capita GDP growth rates are dissimilar for countries or regions, in the context of European Union (EU) structural and regional policies having different initial

conditions: the notion here is usually that of “catching up”, whereby poorer and relatively more backward countries or regions would need to enjoy faster growth rates in order to coverage in terms of income levels towards richer areas. In the context of European integration, these various notions of convergence all have been evoked at different stages and in different circumstances, often with a lot of confusion and misunderstandings. The real convergence, as defined above, should be regarded as at least one of the ultimate goals of European integration is hardly questionable.

2.1.2 Prior Studies

There are six previous studies that examined the feasibility of ASEAN common currency area, they are; 1) Kazushi, Shimizu. (2001). “Intra-ASEAN Economic Cooperation and Monetary and Financial Cooperation: Towards Monetary and Financial Cooperation in East Asia”. Hokkaido University. Economic Journal of Hokkaido University, 30: 69-83, 2) Madhur, Srinivasa. (2002). “Costs and Benefits of a Common Currency for ASEAN”. Asian Development Bank. ERD Working Paper Series no.12, 3) Bunyaratavej, Kraiwinee. (2003). “Convergence and its implications for a common currency in ASEAN”. ASEAN Economic Bulletin. Tuesday, April, 4) Ramayandi, Arief. (2005). “ASEAN Monetary Cooperation: Issues and Prospects”. Australia-Japan Research Centre. Pacific Economic Papers, No. 349, 5) Thangavelu, Shandre M. (2008). “Global Financial Crisis: Impact on Singapore and ASEAN”. EABER Working Paper Series, no.49, 6) Chaudhury, Rafi. (2009). “Feasibility and Implications of a Monetary Union in Southeast Asia”. Middlebury College.

The first previous study of Kazushi, Shimizu, (2001), that titled 'Intra-ASEAN Economic Cooperation and Monetary and Financial Cooperation: Towards Monetary and Financial Cooperation in East Asia' is a qualitative study with the objectives to examine the possibilities of monetary and fiscal cooperation in ASEAN, as a first step towards monetary and financial cooperation in East Asia. The result of this paper is highlight that the ASEAN countries are still strongly connected to external markets, and have adopted FDI dependent and Export-oriented strategy. Latter this study suggest, rather than adopting monetary integration, it is more advantageous for ASEAN to have a degree of flexibility in implementing economic policies including monetary and financial policies. Then this study have opinion that monetary integration should be studied after deepening market integration by the development of AFTA, and should be considered in terms of their relationship with external markets.

The second previous study of Madhur, Srinivasa, (2002), that titled 'Costs and Benefits of a Common Currency for ASEAN' is a qualitative study with the objectives to integrate and synthesize key conclusions in the literature and raise certain issues for further debate and research, rather than break new ground through fresh research. The assessment is largely organized around some of the well-known results, both theoretical and empirical, of works on optimum currency area (OCA). The result of this paper is described that the issue of the costs and benefits of a common currency for the ASEAN needs to be placed in a somewhat global perspective. As Barro, 2001 (excerpt from Madhur, 2002) observes, three sets of factors are likely to encourage the initiation of currency

unions across the globe in the future: (i) the increasing number of countries in the world; (ii) globalization; and (iii) the diminishing role of independent national monetary policies, especially for small countries. At the end of World War II, there were 76 independent countries in the world. Today there are nearly 200. For many of the growing number of smaller countries, the costs of maintaining separate currencies and floating exchange rates are likely to be very high. For them, therefore, the net benefits from joining a monetary union (or simply using another country's currency) are likely to be significant (Barro, 2001 (excerpt from Madhur, 2002). This could encourage the formation of an increasing number of currency union overtime. The increased pace of globalization (including the spread of trade in goods and services and financial transactions and the heightened diffusion of technology) is also likely to encourage the formation of currency unions. In an increasingly globalizing world, there is likely to be greater synchronization of business cycles across countries, and hence the net benefits of having fewer currencies to conduct cross-border business are likely to be larger. Moreover, as the world gets more integrated, the volume of transactions involving citizens of different countries will increase. As international transactions become a larger share of total global transactions, the attractiveness of common currencies relative to a multitude of sovereign currencies is likely to increase. The benefit that economists and central bankers attribute to national monetary policies is also diminishing. There is growing skepticism about the usefulness of independent monetary policies, especially to smaller developing economies, for counter-cyclical stabilization purposes. All these factors have the potential to increase

political support for monetary and economic integration across countries. Overall, therefore, events may become more favorable to the formation of currency unions. Going by international experience, the time required to complete the process is unlikely to be short either. Europe spent several decades in experimenting with regional monetary cooperation before adopting a monetary union. The task may be even more challenging for ASEAN. But it is important not to underestimate the Southeast Asian capacity for "time compression". During the last few decades, time and again, these countries have turned in economic achievements at an unprecedented speed. That record of achievement earned some of them the coveted title of miracle economies. Despite the Asian crisis, the achievement of the ASEAN Free Trade Area (AFTA) in early 2002, much in advance of the original deadline of 2008, is yet another pointer to their capacity for "time compression". With the launching of the AFTA, ASEAN countries have crossed an important milestone: moving closer to what some would refer to as the "good neighbors' stage" of regionalism, in which participating countries abolish trade barriers and create a level playing field for cross border of goods, services, and capital, but allow the pursuit of separate national economic agendas in other areas, especially in the areas of fiscal and monetary policies. It is certainly a very challenging task for the ASEAN to move from the "good neighbors' stage" to the European "happy family stage" of regionalism, in which participating countries also share a common currency; free flow of people across borders; and common institutions, both economic and political, which are required to manage the common currency. But, as is well known, regional monetary integration, by its

very nature, is a long process involving a series of small, incremental, steps over time. Viewed from this perspective, the launching of the AFTA and the regional resources sharing arrangements under the Chiang Mai Initiative may perhaps posses the potential to gradually lead to greater regional monetary cooperation. Moreover, the ASEAN countries have the European experience behind them, and that could be an added advantage (Madhur, 2002).

The third previous study is a research paper that was written by Kraiwinee, (2003), which is titled 'Convergence and its implications for a common currency in ASEAN'. This paper examines the convergence process of real GDP per capita among ASEAN nations, using such convergence modeling techniques. The results can be used to examine the region's suitability for forming a single currency area. After considering all the factors involved, this research describe that it appears that the ASEAN region as a whole may not be an ideal candidates for forming a currency union, as GDP per capita displays a high degree of heterogeneity. Even when one examines countries separately by income levels (low, medium, and high), they still exhibit little evidence of convergence. In fact, sigma convergence analysis and both types of beta convergence analysis consistently point to the existence of economic divergence. We also find that many decades will be required for the low-income countries to catch up with the average income per capita in the ASEAN region. At a broader level, more opportunities for macroeconomic coordination should be taken advantage of prior to taking such a step as a currency union. However, given the promising evidence from the ASEAN currency map, a sub-group of ASEAN countries could begin taking steps

towards a currency union, as a start. As in the case of the current monetary union between Brunei and Singapore, a sub-group could be arranged among countries with a similar income level. Alternatively, it could begin with a core group of countries that already have a supporting framework, in terms of more extensive transactional policy linkages. For example, the ASEAN-6 countries (that is, Brunei, Indonesia, Malaysia, the Philippines, Thailand, and Singapore) may be a particularly suitable candidate. The ASEAN-6 countries have already agreed to reduce tariffs in accordance with the Common Effective Preferential Tariff (CEPT) arrangement. Creating a currency union in this subgroup would further facilitate free trade among them. This sub-group, rather than a Southeast Asian region-wide approach, is broadly consistent with Ngiam and Yuen, 2001 (excerpt from Kraiwinee, 2003). In summary of this paper suggest that, further study will certainly be required in order to choose which collection of countries is best positioned to take the next step forwards currency union. Nonetheless, the lessons learned from the euro experience will likely provide a valuable blueprint for the process of forming a currency union in ASEAN (Kraiwinee, 2003).

The forth previous study is a research paper that written by Ramayandi, Arief, (2005), which is titled “ASEAN Monetary Cooperation: Issues and Prospects”. This paper aims to discuss the underlying economic issues and prospects, from both a theoretical and a practical point view. The analysis focuses only on the five largest ASEAN nations. Standard criteria suggested by the theory of Optimal Currency Areas are reviewed and applied to the region. The paper then provides a discussion on possible steps that can be pursued to realize currency

unis research conclusion described that Indonesia, Malaysia, Singapore, Thailand, and the Philippines appear to be relatively suitable to form a monetary union. This can be justified on least two grounds: the trade pattern among these economies, and the relative symmetry in the nature of their economic shocks. These five countries will potentially reap sizable benefits from having a cooperative monetary policy, or even from a common currency. Similarities in the recent pattern of demand shock components and exchange rate variations among them also suggest that the harmonization process in terms of economic policies may not be as hard as previously thought. Should these current trends continue into the future, practical steps toward full-fledged monetary cooperation may become likely, because of existing impediments, however, the process for integrating the monetary systems in the five ASEAN countries would neither be a smooth nor an easy process. However, the potential also exists for these countries to enjoy benefits from taking such an initiative. If any action is to be taken, attention needs to be carefully directed to the current dispersion in the level of economic development. This aspect alone is potentially harmful to any decision on integrating the monetary system. As has been acknowledged in the literature on monetary cooperation, in addition to the potential benefits, there will inevitably be costs associated with initiating such a process. These costs will not only be a direct cost from the process itself, but also the possibility of having a participant deviate from the agreed arrangement. As far as the level of economic development is concerned, a country may well be tempted to deviate from the agreement if it can capitalize on such non-cooperative action, given that the actions of every

other participant would be known. The rest of the non-deviating participants would potentially bear the costs of such an action. This action could then jeopardize the process and threaten the sustainability of monetary integration at large. To avoid such an eventually, careful staging and strong institution for ensuring the smooth progress of integration needs to be designed. Careful study of the underlying incentive structure behind the process of integration for each potential participant needs to be carried out in order to identify the correct form of the institutional system. In summary, monetary integration in ASEAN, although not impossible, will have to go through a relatively long process before it can be realized. The five largest ASEAN countries seem to be suitable candidates to begin with. Further study concerning the proper institutional set-up and the preferred arrangement will hopefully shed light on the challenges identified (Ramayandi, 2005).

The fifth previous study is a research paper that was written by Thangavelu, Shandre M. (2008), which is titled “Global Financial Crisis: Impact on Singapore and ASEAN”. This paper examines the current state of the Singapore economy and highlights several policy considerations as the city-state adjusts to the current global economic crisis. The paper also discusses the role of ASEAN in the current global economic crisis. A larger single market such as ASEAN will provide stronger economic base to ride out global shocks and thus the integration of ASEAN into ASEAN economic community will be crucial for the long term sustainable growth for Singapore and the region. The integration of the ASEAN as a single market will provide a larger base to smooth out global

shocks and increase the ability of the region to ride external shock more effectively. In this respect, the region should increase its intra-regional trade in ASEAN and Asia. The paper has highlighted several areas where the pace of integration could be effectively increased. The paper also highlighted that the Singapore economy needs to address some of the domestic imbalances to smoothen out the down cycle and increase its opportunities in the upturn of the global economic cycle. In particular, the development of strong human capital and new industries encompassing SMEs will be very important for Singapore to couple itself to the new global production chain that might be emerging from the current global economic crisis, which is likely to be driven by primarily by China and India. The ability of Singapore to ride the current global crisis will depend critically in reducing the cost of the downturn by increasing the productivity of local workers and firms and concurrently enhancing the economic integration opportunities in ASEAN (Thangavelu, 2008).

The sixth previous study is a research paper that was written by Chaudhury, Rafi, (2009), which is titled “Feasibility and Implications of a Monetary Union in Southeast Asia”. This paper attempts to examine the prospects for further monetary integration within the major economies of the ASEAN bloc, namely Singapore, Brunei Darussalam, Philippines, Malaysia, Indonesia, Thailand and Vietnam (henceforth denoted as ASEAN-7). This research conclusion explained that the analysis conducted in this paper considers only one of a variety of macroeconomic issues relevant to a comprehensive discussion of a common currency. It finds that Optimum Currency Area (OCA) eligibility within ASEAN-

7 is the highest it has been in its history, but because there is no single framework by which to evaluate the costs and benefits of a monetary union, it is still too soon to reach a definitive conclusion regarding its suitability. The uncertain economic times ahead however merit discussion on how further integration could help the organization maintain economic stability while raising its regional competitive profile. This study finds that while significant reforms can be made in the absence of such a union, there are likely to be considerable benefits that apply only after full integration takes place (Chaudhury, 2009).

Not only previous study that we found but also, 'Submissions on EMU from leading academics' that written by Peter Keenan as their revisit his 1969 paper of 'The Theory of Optimum Currency Areas: an Eclectic View' in December 2002. This paper conclusion found that in its original form, OCA (Optimum Currency area) theory does not tell us much about the macroeconomic costs of entering into a monetary union. That is because it dealt chiefly with the effects of entering into a simple currency union under conditions of low capital mobility and was, in that context, rightly concerned with the costs of forgoing recourse to exchange rate changes as the first best way to deal with expenditure switching shocks those we would describe today as asymmetric industry specific shocks. It paid no attention whatsoever to the most prominent feature of a full-fledged monetary union the introduction of a single monetary policy. Although we need still to worry about the ability of individual countries to cope with structural change, we longer count on exchange rate changes to facilitate that process. Instead, we stress the need for more flexible labor markets within individual

countries and for improving the quality of the labor force itself. When assessing the optimality of a full-fledged monetary union, we do need to worry about the impact of its monetary policy on individual countries and, for that reason, the likelihood that some members of the union will experience large expenditure changing shocks. But the trade promoting effects of the union will mitigate the consequences of those shocks their interaction with the single monetary policy (Kenen, 2002).

Based on the previous study above, think that it is crucial that we differentiate the method of the study from the previous study of Chaudhury (2009), because we found out from EMU study by Kenen, 2002 research that written by Keenan that conclude the weaknesses of OCA, and now there are no reasons for this study to follow the previous study of Chaudhury (2009) that used OCA, and latter we finally decided that better use Convergence criterion with their whole advantages and benefits. For this purpose, Author decided to choose Farooq Rasheed and Eatzaz Ahmed (2007) journal that titled 'The Convergence Criteria and The SAARC Common Currency', as the main journal of this research study that titled 'Prospect of Forming a Common Currency Area in ASEAN Countries'. The model of principle for launching single currency in Europe is was found in our main journal that titled "The Convergence Criteria and The SAARC Common Currency" that is written by Farooq Rasheed, Eatzaz Ahmed in October 2007. This main journal consist of 7 cross-country standard deviations which are; 1) call money rates, 2) consumer price indices, 3) real exchange rates, 4) growth rates of foreign exchange reserves, 5) growth rates of real volume of trade, 6)

growth rate of relative volume of trade, 7) the growth rates of real per capita GDP. This main journal is investigating the possibility of a common currency formation in the SAARC region using the model of sigma convergence for selected economic indicators. SAARC region is consist of 7 countries, which are; 1) Bangladesh, 2) Bhutan, 3) India, 4) Maldives, 5) Nepal, 6) Pakistan, 7) Sri Lanka, 8) Afghanistan. But in this research Afghanistan and Maldives are not included in the analysis. Methodology that used in this main journal consists of the EMU (European Monetary Union) model principle in launching their single currency (Pitchford and Cox, 1997; in Rasheed and Ahmed, 2007) and the sigma convergence model (Chowdhury, 2004 (excerpt from Rasheed and Ahmed, 2007)). Pitchford and Cox, 1997 (excerpt from Rasheed and Ahmed, 2007), edited the European Monetary Union (EMU) principles for launching single currency for Europe. According to the editors the indicators like real income per capita, call money rate, consumer price index, real exchange rate, exports, imports and balance of payments are vital. In our study we have included the volume of trade both for the country specific and as a world relative index. They used the following data series to apply the beta convergence criteria to evaluate the possibility of the formation of a single currency in the SAARC region. The list of the selected variables is as follows;

i. Call Money Rate (CMR)

ii. Consumer Price Index (CPI)

iii. Real Exchange Rate in US dollars (RER)

iv. Growth rates of Foreign Exchange Reserves (GFER)

v. Growth rates of Real Volume of Trade (GRVT)

vi. Growth rates of Real Relative Volume of Trade (GRRVT)

vii. Growth rates of Per Capita Real GDP at factor cost (GRYPC)

Where;

GRYPC = Growth rate of (GDP/(population))

RER = Nominal Exchange Rate *CPI_{US} / CPI

GRVT = Growth rates of {(Exports + Imports)/CPI}

GRRVT = Growth rates of {(Exports + Imports)/CPI} / {(Exports $_W$ + Imports $_W$)/CPI_W}

Note; W = indicating world

All estimations are based on quarterly in this main journal for the period 1991:1 to 2006:3 for six SAARC members, i.e., Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. Due to non-availability of the required data, Afghanistan and Maldives are not included in the analysis. It is expected, however, that inclusion of these two countries will not make a significant difference in the conclusions. All the data are taken from International Financial Statistics and Direction of Trades Statistics.

This main journal latter following Chowdhury, 2004 (excerpt from Rasheed and Ahmed, 2007), the sigma convergence model used is given as;

$\sigma_j = \alpha + \beta_j t + \varepsilon_j$ …….(2.1)

Where;

σ_j = is the standard deviations across the member countries

j^{th} = indicator (j = 1 to 7)

α and β = are the parameters of the model

t = represents time period

ε = is a stochastic error term

Note: a significant negative value of β indicates the possibility of convergence, while any other value of β implies non-convergence.

Due to non-availability of the required data, call money rate is not included in the analysis of this research study that titled 'Prospect of Forming a Common Currency Area in ASEAN Countries'. It is expected, however, that inclusion this indicator will not make a significant difference in the conclusions.

2.2 Conceptual Framework

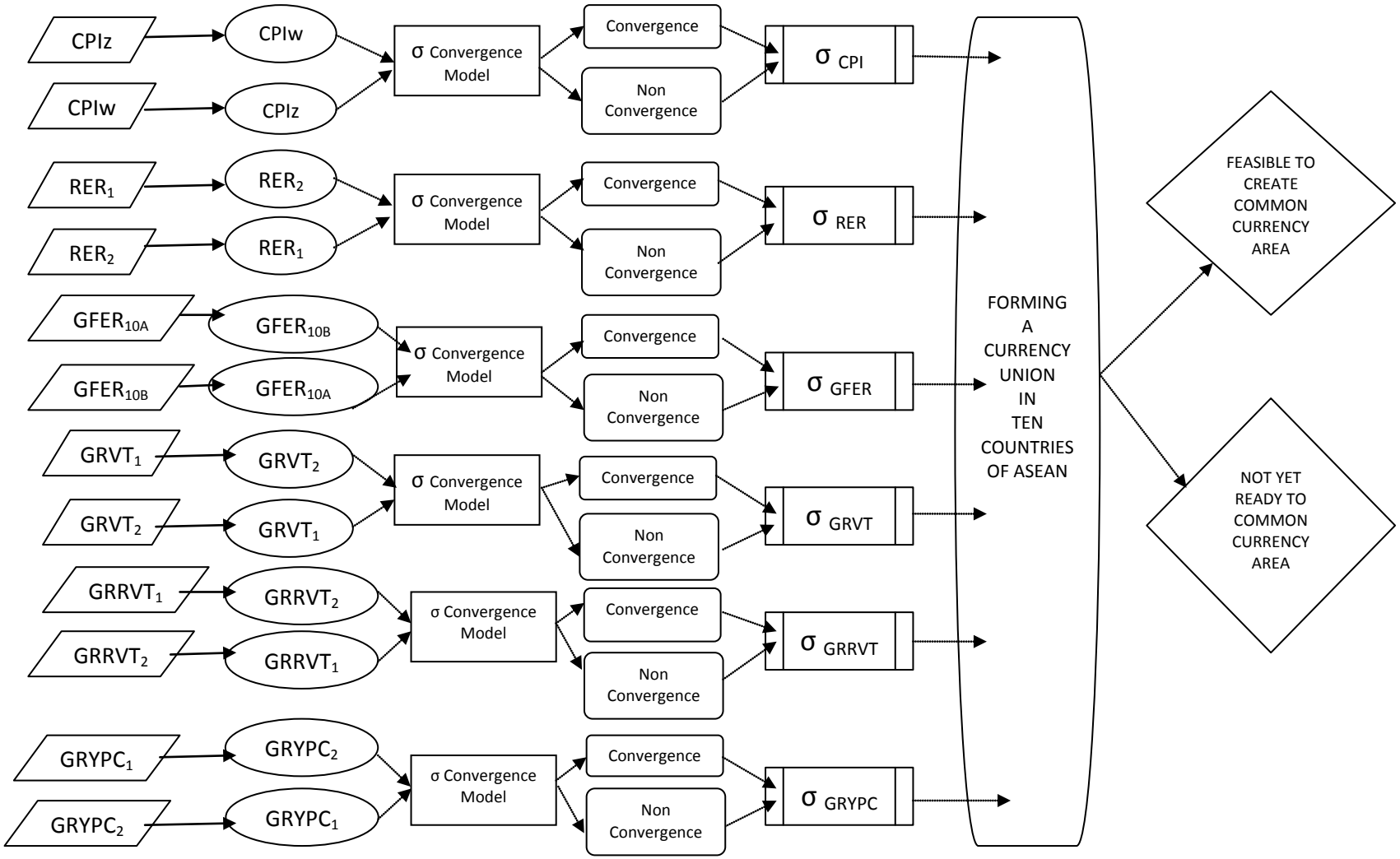
Based on above prior studies, we can define the conceptual framework in this research as shown in the Figure 2.1.

2.3 Hypothesis

Hypothesis is defined as short explanation which is conclude from literature review (grand theory and previous study), in which created and is accepted as answer for temporary period in order to test the fact in the future (Economic Faculty, 2008). After conceptual framework has been made, the hypothesis of the research are;

1. There is a good prospect of forming a common currency area in ASEAN-10 that consist of Indonesia, Brunei Darussalam, Malaysia, Philippines, Thailand, Singapore, Vietnam, Myanmar, Laos, Cambodia, where the six economics indicator that consist of; (1) Consumer Price Indices (CPI), (2) Real Exchange Rate in US dollars (RER), (3) Growth rates of Foreign Exchange Reserves (GFER), (4) Growth rates of Real Volume of Trade (GRVT), (5) Growth rate of Real Relative Volume of Trade (GRRVT), (6) Growth rates of Per Capita Real GDP at factor cost (GRYPC), are supporting the feasibility of ASEAN-10 countries to creating common currency area.
2. There is possibility of convergence model to be alternative of OCA model.

Figure 2.1
Conceptual Framework



Note: = independent variable = dependent variable = indicator process = indicator result determination = σ result = result analysis
= final decision = pooled cross section regression = analysis

Table 2.1
Prior Studies

Research	Objectives & Goals	Research Model	Result
Rasheed and Ahmed "The Convergence Criteria and The SAARC Common Currency", 2007	This study explores prospects of forming a common currency area in the SAARC region by applying sigma-convergence criteria on seven economic indicators selected on the basis of EMU standards for forming a currency union.	Methodology that used in this main journal consists of the EMU (European Monetary Union) model principle in launching their single currency (Pitchford and Cox, 1997) and the sigma convergence model (Chowdhury, 2004). Pitchford and Cox (1997) edited the European Monetary Union (EMU) principles for launching single currency for Europe. According to the editors the indicators like real income per capita, call money rate, consumer price index, real exchange rate, exports, imports and balance of payments are vital. In our study we have included the volume of trade both for the country specific and as a world	For the most recent time period in this study i.e., 2000:1 to 2006:3 this research found that interest rate, real exchange rate, growth rate of trade volume, growth rate of relative trade volume and growth rate of real per capita GDP show promising trends and some degree of synchronization is observed in the SAARC bloc, which is helpful for forming a currency union in

		relative index. They used the following data series to apply the beta convergence criteria to evaluate the possibility of the formation of a single currency in the SAARC region. The list of the selected variables is as follows; i. Call Money Rate (CMR) ii. Consumer Price Index (CPI) iii. Real Exchange Rate in US dollars (RER) iv. Growth rates of Foreign Exchange Reserves (GFER) v. Growth rates of Real Volume of Trade (GRVT) vi. Growth rates of Real Relative Volume of Trade (GRRVT) vii. Growth rates of Per Capita Real GDP at factor cost (GRYPC) Where; GRYPC = Growth rate of (GDP/(population))	SAARC.

		RER = Nominal Exchange Rate *CPI_{US} / CPI GRVT = Growth rates of {(Exports + Imports)/CPI} GRRVT = Growth rates of {(Exports + Imports)/CPI} / {(Exports $_W$ + Imports $_W$)/CPI_W} Note; W = indicating world All estimations are based on quarterly in this main journal for the period 1991:1 to 2006:3 for six SAARC members, i.e., Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. Due to non-availability of the required data, Afghanistan and Maldives are not included in the analysis. It is expected, however, that inclusion of these two countries will not make a significant difference in the conclusions. All the data are taken from International Financial Statistics and Direction of Trades Statistics. This main journal latter following Chowdhury (2004), the sigma convergence model used is given as; $\sigma_j = \alpha + \beta_j t + \varepsilon_j$……(2.1)	

		Where; σ_j = is the standard deviations across the member countries j^{th} = indicator (j = 1 to 7) α and β = are the parameters of the model t = represents time period ε = is a stochastic error term Note: a significant negative value of β indicates the possibility of convergence, while any other value of β implies non-convergence.	
Kazushi, Shimizu "Intra-ASEAN Economic Cooperation and Monetary and	the objectives of this study is to examined the possibilities of monetary and fiscal cooperation in ASEAN, as a first step towards monetary and financial cooperation in East Asia	This research method is qualitative study.	The result of this paper is highlight that the ASEAN countries are still strongly connected to external markets, and have adopted FDI dependent and Export-oriented strategy. Latter this study suggest, rather than adopting monetary

Financial Cooperation: Towards Monetary and Financial Cooperation in East Asia", 2001			integration, it is more advantageous for ASEAN to have a degree of flexibility in implementing economic policies including monetary and financial policies. Then this study have opinion that monetary integration should be studied after deepening market integration by the development of AFTA, and should be considered in terms of their relationship with external markets.
Madhur, Srinivasa 'Costs and Benefits of a Common	the objectives to integrate and synthesize key conclusions in the literature and raise certain issues for further debate and research,	This research method is qualitative study.	The result of this paper is described that Europe spent several decades in experimenting with regional monetary cooperation before

Currency for ASEAN', 2002	rather than break new ground through fresh research. The assessment is largely organized around some of the well-known results, both theoretical and empirical, of works on optimum currency area (OCA). The result of this paper is described that the issue of the costs and benefits of a common currency for the ASEAN needs to be placed in a somewhat global perspective.		adopting a monetary union. The task may be even more challenging for ASEAN. But it is important not to underestimate the Southeast Asian capacity for "time compression". During the last few decades, time and again, these countries have turned in economic achievements at an unprecedented speed. That record of achievement earned some of them the coveted title of miracle economies. Despite the Asian crisis, the achievement of the ASEAN Free Trade Area (AFTA) in

			early 2002, much in advance of the original deadline of 2008, is yet another pointer to their capacity for “time compression”. With the launching of the AFTA, ASEAN countries have crossed an important milestone: moving closer to what some would refer to as the “good neighbors’ stage” of regionalism, in which participating countries abolish trade barriers and create a level playing field for cross border of goods, services, and capital, but allow the pursuit of separate national economic agendas

			in other areas, especially in the areas of fiscal and monetary policies. Viewed from this perspective, the launching of the AFTA and the regional resources sharing arrangements under the Chiang Mai Initiative may perhaps posses the potential to gradually lead to greater regional monetary cooperation.
Bunyaratavej, Kraiwinee "Convergence and its implications for a	This paper examines the convergence process of real GDP per capita among ASEAN nations, using such convergence modeling techniques.	This research method is qualitative study.	The results can be used to examine the region's suitability for forming a single currency area. After considering all the factors involved, this research describe that it appears that

common currency in ASEAN", 2003			the ASEAN region as a whole may not be an ideal candidates for forming a currency union, as GDP per capita displays a high degree of heterogeneity. However, given the promising evidence from the ASEAN currency map, a sub-group of ASEAN countries could begin taking steps towards a currency union, as a start. In summary of this paper suggest that, further study will certainly be required in order to choose which collection of countries is best positioned to take the next step forwards currency

			union.
Ramayandi, Arief "ASEAN Monetary Cooperation: Issues and Prospects", 2005	This paper objective is to discuss the underlying economic issues and prospects, from both a theoretical and a practical point view. The analysis focuses only on the five largest ASEAN nations. Standard criteria suggested by the theory of Optimal Currency Areas are reviewed and applied to the region.	This paper is a qualitative study that provides a discussion on possible steps that can be pursued to realize currency union.	This research conclusion described that Indonesia, Malaysia, Singapore, Thailand, and the Philippines appear to be relatively suitable to form a monetary union. This can be justified on least two grounds: the trade pattern among these economies, and the relative symmetry in the nature of their economic shocks. These five countries will potentially reap sizable benefits from having a cooperative monetary policy, or even from a common currency.

			Similarities in the recent pattern of demand shock components and exchange rate variations among them also suggest that the harmonization process in terms of economic policies may not be as hard as previously thought. However, the potential also exists for these countries to enjoy benefits from taking such an initiative. The five largest ASEAN countries seem to be suitable candidates to begin with.
Thangavelu, Shandre M. “Global	This paper examines the current state of the Singapore economy and		Result that larger single market such as ASEAN will provide stronger economic

Financial Crisis: Impact on Singapore and ASEAN", 2008	highlights several policy considerations as the city-state adjusts to the current global economic crisis.	This paper is a qualitative study that provides a discussion on possible steps that can be pursued to realize currency union.	base to ride out global shocks and thus the integration of ASEAN into ASEAN economic community will be crucial for the long term sustainable growth for Singapore and the region. The integration of the ASEAN as a single market will provide a larger base to smooth out global shocks and increase the ability of the region to ride external shock more effectively. In this respect, the region should increase its intra-regional trade in ASEAN and Asia.
Chaudhury,	This paper attempts to	The econometric model used in this study	This research conclusion

Rafi "Feasibility and Implications of a Monetary Union in Southeast Asia", 2009	examine the prospects for further monetary integration within the major economies of the ASEAN bloc, namely Singapore, Brunei Darussalam, Philippines, Malaysia, Indonesia, Thailand and Vietnam (henceforth denoted as ASEAN-7).	draws from the "OCA Index" method established in Bayoumi and Eichengreen (1997). $SD(e_{ij}) = \alpha + \beta_1 SD(\Delta y_i - \Delta y_j) + \beta_2 DISSIM_{ij} + \beta_3 TRADE_{ij} + \beta_4 SIZE_{ij} + \varepsilon$ Note: $SD(e_{ij})$ = standard deviation of the year-on-year (YOY) change in the logarithm of the nominal exchange rate between countries i and j. $SD(\Delta y_i - \Delta y_j)$ = is the standard deviation of the difference of the logarithm of real output between i and j. $DISSIM_{ij}$ = sums the absolute differences in the shares of agricultural, mineral and manufacturing trade in total merchandise trade. $TRADE_{ij}$ = is the mean of the ratio of bilateral exports to domestic GDP for the	explained that the analysis conducted in this paper considers only one of a variety of macroeconomic issues relevant to a comprehensive discussion of a common currency. It finds that Optimum Currency Area (OCA) eligibility within ASEAN-7 is the highest it has been in its history, but because there is no single framework by which to evaluate the costs and benefits of a monetary union, it is still too soon to reach a definitive conclusion regarding its suitability. The uncertain economic times

		two countries. $SIZE_{ij}$ = is the mean of the logarithm of the two GDPs.	ahead however merit discussion on how further integration could help the organization maintain economic stability while raising its regional competitive profile. This study finds that while significant reforms can be made in the absence of such a union, there are likely to be considerable benefits that apply only after full integration takes place.
Keenan, Peter "The Theory of Optimum	This study objective to answer 4 questions, which are; (1) what were the main findings of OCA theory? (2) Are they truly applicable to	This research method is qualitative study.	This paper conclusion found that in its original form, OCA (Optimum Currency area) theory does not tell us much about the

Currency Areas: an Eclectic View”, 2002.	the analysis of a full-fledged monetary union? (3) How were those findings applied by economists trying to decide whether the European Union is an optimum currency area? (4) Might the effects of a monetary union enhance the optimality of that union?		macroeconomic costs of entering into a monetary union. When assessing the optimality of a full-fledged monetary union, we do need to worry about the impact of its monetary policy on individual countries.

CHAPTER III

DATA AND METHODOLOGY

3.1 Research Variables and Operational Definition

Operational definition is a kind of definition which gives to some variables or the constructs meaning or activity specification, or gives an operational which is needed to measure the construct or the variables (Nazir, 1998). As a guidance to this research and in order to create hypothesis test. It means that we need to explain the variable that we use. Pitchford and Cox, 1997 (excerpt from Rasheed and Ahmed, 2007) edited the European Monetary Union (EMU) principles for launched single currency for Europe. According to them, the indicators like real income per capita, call money rate, consumer price index, real exchange rate, exports, imports and balance of payments are vital. In this study we have included the volume of trade both for the country as a specific and as a world relative index. We used the following data series to apply the beta convergence criteria to evaluate the possibility of the formation of a single currency in ASEAN countries. The list of the selected variables is as follows;

(1) Consumer price indices (CPI)

Consumer price indices in this research means as an inflationary indicator that measures the change in the cost of a fixed basket of products and services, including: housing, electricity, food, and transportation. Consumer price indices also mean as an index of prices used to measure the

change in the cost of basic goods and services in comparison to a fixed base period, which is also called, cost-of-living-index.

(2) Real Exchange Rates in US Dollar (RER)

Real exchange rates in US Dollar in this research means as the price of one currency expressed in terms of U.S. Dollar which is adjusted for inflation.

(3) Growth rates of foreign exchange reserves (GFER)

Growth rates of foreign exchange reserves in this research means as the amount of increase of a deposit of a foreign currency of other countries as assets which allow a government to keep their currencies stable and reduce the effect of economic shocks.

(4) Growth rates of real volume of trade (GRVT)

Growth rates of real volume of trade in this research means as the amount of increase of the number of shares, bonds or contracts, traded during a given period. For a security, or an entire exchange that are adjusted for inflation.

(5) Growth rate of a real relative volume of trade (GRRVT)

Growth rate of a real relative volume of trade in this research means the amount of increases of a measurement of one investment or financial instruments value relative to another’s in the number of shares, bonds, or contracts which were traded during a given period for a security or an entire exchange that adjusted for inflation.

(6) Growth rate of real per capita GDP at factor cost (GRYPC).

Growth rate of real per capita GDP at factor cost in this research means as the amount of increase an approximation of the value of goods produced per person in the country's GDP divided by the total number of people in the country at the total money, time and resources of a firm engaged in the business of financing accounts receivable which is the activity known as factoring with a purchase or activity that were adjusted for inflation.

3.2 Population and Samples

The panel data from this research covers 10 countries in ASEAN, they are:

1. Brunei Darussalam
2. Cambodia
3. Indonesia
4. Laos
5. Malaysia
6. Myanmar
7. Philippines
8. Singapore
9. Thailand
10. Vietnam

3.3 Type of Data and Sources

All the data are taken from International Financial Statistics of IMF 2004 and also taken from Nation Master, UN data, Asian Development Bank, CIA World Fact book of the year of observation from 1995 until 2003.

We follow Alam (2001), which used panel data for his study of a common currency.

3.4 Method of Collecting Data

Data that are used in this research are secondary data, which are collected from literature that are related to this research. The literature data that we use in this research are; note, document, and also article data.

All the data that we gained latter we are managed and processed in order to match it to be able to be used to answer the research question.

For this research purpose we require data from the library of UNDIP (Diponegoro University) in Semarang City of the International Financial Statistics of IMF 2004 and we also searching data on-line through internet until finally we found the website of; Nation Master, UN data, Asian Development Bank, CIA World Fact book, Inflation Data, Economagic, Association of Southeast Asian Nations, Fact Set, Asia Regional Integration Center, Federal Reserve of New York, National Bank of Cambodia, National Bank of Singapore, National Bank of Malaysia, National Bank of Philippines, National Bank of Thailand, National Bank of Indonesia, National Bank of Brunei Darussalam, National Bank of Vietnam, National Bank of Myanmar, National Bank Republic of Lao, that help us to complete the data that we gained before from UNDIP library.

Data that we have collected from all sources are; 1) Consumer Price Index (CPI), 2) Nominal exchange rate, 3) Export, 4) Import, 5) Population, 6) Gross Domestic Product (GDP).

3.5 Method of Analysis

This research uses quantitative statistics in the form of panel data of economic regression method. Quantitative stages of analysis consist of regression model estimation which used panel data econometrics regression method through Chowdhury , 2004 (excerpt from Rasheed and Ahmed, 2007), the sigma convergence model and also completed by a classic assumption test and statistically test.

3.5.1 Panel Data Regression Model Specification.

This research used Panel data. Panel data are a group of individuals, object, company and etc, in a current period of time of specific unit. Panel data are a combination of *cross section data* and *time series data.* As we know that this model is focuses on the regression analysis and the combination of time series and cross section, which is usually called as pooled time series. Panel regression models are based on panel data. Panel data consists of observations on the same cross-sectional, or individual, units over several time periods (Gujarati, 2003).

Time series unique characteristic is numeric sequence which is the interval between observation on some variable identifying feature constant and fix, otherwise cross section is an analysis unit on the spot with an observation on some variables. Analysis unit example could be use such as, individuality, city, region, regency, province, country, business, household or industry. In short if some variables for some cross sections which have a

differences in observation are specific periods of time, it means that it will gain pooling data. The reasons for using panel data are:

1. It will help to increase the total samples or observations in otherwise it means it will help limitation data problems in a time series period of time.
2. It will give a result which is a variation between different unit based on spatial and variation determination which rises based on time period.

Therefore, pooling data will help the analytical process that will be explained, analyzed, and test for the hypothesis which is for the result or inside the in progress process to gained the result. Estimation model equation (depends on assumption that we made about the intercept, slope and error term. Where there are some possibilities (Gujarati, 2003):

a) Assumption which is the intercept and the coefficient slope whether it is constant inter time period and inter space and supported by the error term which involves all along time differences and space in individuality.
b) Slope coefficient is constant but there is a variation between the individual intercept.
c) Slope coefficient is constant but there is a variation between a time intercept.
d) Slope coefficient is constant but there is a variation between time and individuality.
e) All coefficients which consist of intercept and slope coefficient are variations in individual region.

There are several types and techniques in panel data, such as (Gujarati, 2003);

1. Fixed Effects Model (FEM)

In FEM model, the intercept of regression model determine between one to another data, or cross-sectional, each unit has their own special characteristics. To calculate variable to another intercept, so we use dummy variable. FEM which is used dummy variables is called LSDV (Least-Squares Dummy Variables).

Equation: $Y_{it} = \alpha_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + \ldots..$et. al. (3.1)

In which:

Y_{it} = Dependent variable

α_1 = constant

$\alpha_{2\text{-}4}$ = coefficient

$D_{2\text{-}4}$ = *dummy variable*

2. Random Effects Model (REM) or Error Components Model (ECM).

REM or ECM is another alternative which assumes that intercept of each data individually selected by random or randomly selected in a large population have constant mean.

Equation: $Y_{it} = \alpha_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \ldots..$dst (3.2)

In which:

Y_{it} = Dependent variable

α_1 = constant

α_{2-4} = coefficient

X_{2-4} = Independent variable

3. Common Model

This model assumes that both intercept coefficient and slope coefficient are constant in cross of place and time.

Equation: $Y_{it} = \alpha_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \ldots. + \mu$ (3.3)

In which:

Y_{it} = Dependent variable

α_1 = constant

α_{2-4} = coefficient

X_{2-4} = Independent variable

μ = error

3.5.2 Estimation Model Determination in Panel Data

From three panel data method approaches, there are two approaches that are commonly used to estimate the regression model in panel data, they are fixed effect model and random effect model. To determine the method between pooled least square and fixed effect we test it through F test, and Hausman test will be used to determine between random effect and fixed effect (Winarno, 2009). In fixed effect, the general regression equation panel data is (Gujarati, 2003):

$$Y_{it} = \beta_1 + \beta_2 X_{it} + \beta_3 X_{3it} + \ldots + \beta_n X_{nit} + u_{it} \quad (3.4)$$

F test could be used to determine between pooled least square (PLS) model and fixed effect model. The equation is (Gujarati,2003)

$$F = \frac{(R^2_{ur} - R^2_r)/(m)}{(1-R^2_{ur})/(n-k)} \quad (3.5)$$

In which:

R^2_r = R^2 PLS model

R^2_{ur} = R^2 FEM model

m = restricted variabel total

n = sample total

k = explained variable total

Null Hypothesis of restricted F-test, is:

H_0 = *Pooled Least Square (restricted)* model

H_1 = *Fixed Effect (unrestricted)* model

From the equation above, we can get the result of value $F_{statistics} > F_{table}$ in certain degree of freedom (α). This result allows us to reject null hypothesis H_0 which states to choose PLS model, because of the above result, we should choose H_1 which states that we must use *Fixed Effect* model estimation in this research.

Haussman test is used to determine between *fixed effect* method and *random effect* method. *Chi Square* value equation of Hausman test, is:

Matrix b_diff = b_fixed – b_random

Matrix var_diff = cov_fixed – cov_random

Matrix qform = @transpose(b_diff)*@inverse(var_diff)*b_diff

Null Hypothesis of Haussman test, is:

H_0 = *random effect*

H_1 = *fixed effect*

Suppose *Chi Square* $_{statistic}$ > *Chi Square* $_{table}$ or in other word, while *p*-value > 0.005. It means that we should reject null hypothesis H_0 and determine that *fixed effect* model is the suitable model to use (Winarno, 2009). Hausman test is also available through *Eviews-6 command program.* Slope coefficient is constant but there is a variation between individual intercept.

3.5.3 Econometric Model of the Research Study

The method that used in this research consists of the EMU (European Monetary Union) model principle in launching their single currency (Pitchford and Cox, 1997 (excerpt from Rasheed and Ahmed, 2007) and the sigma convergence model (Chowdhury, 2004 (excerpt from Rasheed and Ahmed, 2007)). Pitchford and Cox, 1997 (excerpt from Rasheed and Ahmed, 2007) edited the European Monetary Union (EMU) principles for launching single currency for Europe. According to the editors the indicators like real income per capita, call money rate, consumer price index, real exchange rate, exports, imports and balance of payments are vital. In this study, we have included the volume of trade both for the country specific and as a world relative index. They used the following data series to apply the beta convergence criteria to evaluate the

possibility of the formation of a single currency in the Asia. The list of the selected variables is as follows;

viii. Consumer Price Index (CPI)

ix. Real Exchange Rate in US dollars (RER)

x. Growth rates of Foreign Exchange Reserves (GFER)

xi. Growth rates of Real Volume of Trade (GRVT)

xii. Growth rates of Real Relative Volume of Trade (GRRVT)

xiii. Growth rates of Per Capita Real GDP at factor cost (GRYPC)

In which;

GRYPC = Growth rate of (GDP/(population))

RER = Nominal Exchange Rate *CPI_{US} / CPI

GRVT = Growth rates of {(Exports + Imports)/CPI}

GRRVT = Growth rates of {(Exports + Imports)/CPI} / {(Exports $_W$ + Imports $_W$)/CPI_W}

Note; W = indicating world

This research follows Chowdhury (2004), in Rasheed and Ahmed (2007), the sigma convergence model used is given below;

$$\sigma_j = \alpha + \beta_j t + \varepsilon_j \quad \text{…….(3.6)}$$

In which;

σ_j = the standard deviations across the member countries

j^{th} = indicator (j = 1 to 6)

α and β = the parameters of the model

t = time period

ε = a stochastic error term

Note: a significant negative value of β indicates the possibility of convergence, while any other value of β implies non-convergence.

To process panel model above, Eviews 6.0 is used based on the reason that Eviews 6.0 is the newest version in this year which is much easier than the previous version and also is friendly user interface.

3.5.4 Classic Assumption Test

Related to OLS method use, to result a parameter value and model of probability in precisely, because of that reason we need to test it first is this model deviate or take a side route from classic assumption where is consist of;

a. Normality Test

Before hypothesis testing is done, we should do the classic assumption test first. Classic linear assumption is a model that is free from multicollinearity, autocorrelation and heteroskedasticity. There are some ways to examine classic linear assumption as below: (Gujarati, 2003)

Normality test goal is to find out is there normal distribution between dependent and independent variable. The good fit regression model which is had normal distribution. In this research we used Jarque-Bera test model.

The JB test of normality is an asymptotic, or large-sample, test. It is also based on the OLS residuals. This test first computes the skewness and kurtosis measures of the OLS residuals by using the following test statistic:

$$JB = n\left[\frac{S^2}{6} + \frac{(K-3)^2}{24}\right] \sim X^2 \qquad (3.7)$$

In which:

n = sample size

S = skewness coefficient

K = kurtosis coefficient

Ho: normal distribution data

Ha: not a normal distribution data

If the computed *p* value of the JB statistics in an application is sufficiently low, in which the value of the statistics is very different from 0, one can reject the hypothesis. But if the p value is reasonably high, in which the value of the statistic is close to zero, we do not reject the normality assumption.

Or in short we can say that JB test method measures value of skewness and kurtosis if JB statistic < X^2 Chi-square value table, it means that residual value distribution is normal (Firmansyah, 2000)

b. Multicollinearity Test

Multicollinearity relationship to the linear situation which is to be sure or close to independent variable (Gujarati, 2003), multicollinearity problems rise when independent variables have a correlation among each other. Whether to decrease the ability to explain and predict multicollinearity, it also causes a mistake of t test coefficient to un-trust indicators. One of the assumptions of the classical linear regression model is that there is no

multicollinearity among the explained variables. The purpose of multicollinearity test is to know if there is relationship among independent variables where has a linear correlation inside the regression model used. If multicollinearity happens, it will cause prediction variable become higher, t statistic will be unbiased but not efficient. The term multicollinearity is due to Ragnar Frisch. Originally it meant the existence of a “perfect”, or exact, linear relationship among some or all explanatory variables of a regression model. For the k-variable regression involving explanatory variable $X_1,X_2,\ldots,X_k$ (where $X_1=1$ for all observations to allow for the intercept term), an exact linear relationship is said to exist if the following condition is met:

$$\lambda_1 X_1 + \lambda_2 X_2 + \ldots. + \lambda_k X_k = 0 \qquad (3.8)$$

The consequences of multicollinearity are as follows: if there is perfect collinearity among the X’s, their regression coefficients are indeterminate and standard errors are not defined. If collinearity is high but not perfect, estimation of regression coefficients is possible but their standard errors tend to be large. As a result, the population values of the coefficients cannot be estimated precisely. However, if the objective is to estimate linear combinations of these coefficients, the estimable functions, this can be done even in the presence of perfect multicollinearity. The speed with which variances and covariances increase can be seen with the variance-inflating factor (VIF), Which is defined as:

$$\text{VIF} = \frac{1}{1-r_j^2} \qquad (3.9)$$

VIF shows how the variance of an estimator is inflated by the presence of multicollinearity. As r_j^2 approaches 1, the VIF approaches infinity. That is, as the extent of collinearity increases, the variance of an estimator increases, and in the limit it can become infinite. As it can be readily seen, if there is no collinearity between X_2 and X_3, VIF will be 1. If the speed with which variances and covariance increase, which can be seen with the variance-inflating factor (VIF), it may be noted that the inverse of the VIF is called tolerance (TOL). That is:

$$TOL_j = \frac{1}{VIF_j} = \left(1 - R_j^2\right) \tag{3.10}$$

When $R_j^2 = 1$ (i.e., perfect collinearity), $TOL_j = 0$ and $R_j^2 = 0$ (i.e., no collinearity whatsoever), TOL_j is 1. Because of the intimate connection between VIF and TOL, one can use them interchangeably. In this research multicollinearity test will be done through auxiliary regression to detect is there any multicollinearity. The criteria is if R^2 of regression equation more than R^2 auxiliary regression it means that there is no multicollinearity inside. Auxiliary regression model are,

$$F_t = \frac{R^2 \cdot \frac{X_1 \cdot X_2 \cdot X_3 \cdots X_k}{(k-2)}}{(1 - R^2 \cdot X_1 \cdot X_2 \cdot X_3 \cdots X_k)/(N - k + 1)} \tag{3.11}$$

c. Autocorrelation Test

Autocorrelation or serial correlation is a correlation which happens beyond observed items that are closed each other. If this assumption clays not as happen it cause OLS estimator not efficient anymore, because of the width

range of degree of freedom, it means that ‘t’ test and ‘F’ test will have become low validity and weak. Autocorrelation is defined as correlation between a group of observed items which are sorted based on time (such as inside the time series) or based on spaces (such as inside the cross section). Autocorrelation generally happens in time series data but it does not happen in cross sectional data. In time series data, observation sorted by chronological sequence which gives a high possibilities of inter correlation happen if the interval between both observations is very short. One of the famous tests to find out autocorrelation indication is Durbin-Watson test. This test is actually based on error model. The correlation equation is described below:

$$\mu_t = \rho\ \mu_{t-1} + v_t \qquad (3.12)$$

Where:

μ_t = error that happened in t time

μ_{t-1}= error that happened in t-1 time

ρ = autocorrelation coefficient lag-1 (to measure correlation between residuals of t time and residuals of t-1 time)

v_t = error which is independent characteristic and in a normal distribution which is with a median value equals to zero (median value = 0), and in σ^2 varians.

If $\rho = 0$, it can take as a result that is no serial correlation in residual, therefore this test uses this hypothesis:

HO : $\rho = 0$

H1 : $\rho \neq 0$

Durbin-Watson statistics, are;

$$DW = \frac{\sum_{t-2}^{n}(\mu_t - \mu_{t-1})^2}{\sum_{t-1}^{n}\mu_t^2} \quad (3.13)$$

Where:

$\mu_t = Y_t - \beta_0 - \beta_1 X_t = Y_t - Y_t$, which is residual in t time

$\mu_{t-1} = Y_{t-1} - \beta_0 - \beta_1 X_{t-1} = Y_{t-1} - Y_{t-1}$, which is residual in (t-1) time

Equation (3.6) can be written in the form, below;

$$DW = \frac{2[1-\sum \mu_t \cdot \mu_{t-1}]}{\sum {\mu_t}^2} = 2(1-\rho) \quad (3.14)$$

Equation (3.7) can be written in shape below;

$$\rho = \frac{(\mu_t - \mu_{t-1})^2}{\sum {\mu_t}^2} \quad (3.15)$$

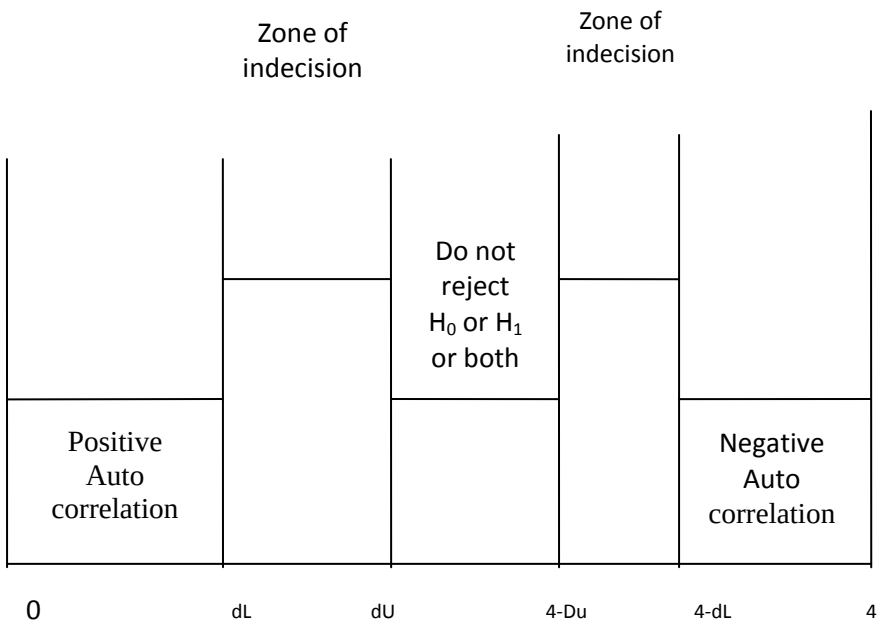
As mentioned before that ρ is the autocorrelation coefficient which has a value $-1 \leq \rho \leq 1$. Based on (3.15) they mean:

1. If *DW* statistics value is 2, ρ is 0 (ρ = 0), it means there is no autocorrelation.

2. If *DW* statistics value is 0, ρ is 1 (ρ = 1), where it means there is no positive autocorrelation.

3. If *DW* statistic value is 4, ρ is -1 (ρ = -1), where it means there is no negative autocorrelation.

Figure 3.1
Durbin-Watson



If the assumption of the classical linear regression model that the error disturbance μ_i entering into the population regression function (PRF) are random whether uncorrelated is violated, the problem of serial or autocorrelation arises.

The term autocorrelation may be defined as "correlation between members of time series of observations ordered in time (as in time series data) or space (as in cross section data)." In regression context, the classical linear regression model assumes that such autocorrelation does not exist in the disturbances μ_i . Symbolically,

$$E(\mu_i \mu_j) = 0 \qquad i \neq j \tag{3.16}$$

Autocorrelation can arise for several reasons, such as inertia or sluggishness of economic time series, specification bias resulting from excluding important variables from the model or using incorrect functional form, the cobweb phenomenon, data massaging, and data transformation. As a result, it is useful to distinguish between pure autocorrelation and "induced" autocorrelation because of one or more factors just discussed.

d. Heteroscedasticity Test

A critical assumption of the classical linear regression model is that the disturbance μ_i has the same variance, σ^2. If this assumption is not satisfied, there is heteroscedasticity. Heteroscedasticity does not destroy the unbiasedness and consistency properties of OLS estimators. But these estimators are no longer minimum variance or efficient. That is, they are not linear, unbiased, efficient estimator (BLUE). The BLUE estimators are provided by the method of weighted least squares, provided the heteroscedastic error variances, σ_i^2, are known. The most important in classic linear regression is that disturbance that rising inside population regression is heteroscedasticity which is all variable have a similar variation. In this regression might be found indication of heteroscedasticity. Heteroscedasticity indication could be detected through Glejser test, if the value regress unstandardized residuals absolute value with their independent variable.

$$E(u^2_i) = \sigma^2 \qquad i = 1, 2, \ldots, n \tag{3.17}$$

Measurement which is used is by observing the 't' value and 'p' value (probability value). If all independent variables are statistically significant, all

of the regression models contain heteroscedasticity. The conclusion that can be taken is that if Sig t < α (0.05) the regression equation contains heteroscedasticity and otherwise if the value of Sig t > α (0.05) it does not contain heteroscedasticity. Another way that we can take to test whether heteroscedasticity is a serious problem in particular set of data or not is by *White's Heteroscedasticity-Consistent Variances and Standard Errors*. White has shown that this estimate can be performed so that there is asymptotically valid (i.e., large-sample) statistical inference can be made about true parameter values. As the preceding result show, (White's) heteroscedasticity-corrected standard errors are considerably larger than the OLS standard errors and therefore the estimated t values are much smaller than those obtained by OLS. On the basis of the latter, both the regressors are statistically significant at the 5 percent level, whereas on the basis of White's estimators they are not. However, it should be pointed out that White's heteroscedasticity-corrected standard errors can be larger or smaller than the uncorrected standard errors (Gujarati, 2003).

Since White's heteroscedasticity-consistent estimators of the variance are now available in established regression packages, it is recommended that the reader report them. As Wallace and Silver note (Wallace and Silver in Gujarati, 2003);

> Generally speaking, it is probably a good idea to use the White option (available in regression programs) routinely, perhaps comparing the output with regular OLS output as a check to see whether heteroscedasticity is a serious problem in particular set of data.

3.5.5 Regression Statistic Test Analysis

After classical assumption test finishes and the result is free from classical assumption then regression statistic test analysis need to be done.

a. Hypothesis Test Method

If the result of the econometric model in this research is free from classical assumption, then hypothesis test needs to be done. Hypothesis test is made through significant test to each independent variable to dependent variable which is done partially or together by through t test and F test.

b. Jointly Regression Coefficient Test (F test)

F test goal is to determine the significance of independent variable groups in influencing the dependent variable,

$$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_k = 0$$

$$H_1 : \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_k \neq 0$$

Suppose this research results in F_0 ($F_{\text{statistic}}$) < (F_{table}), it means that null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. If this condition happens, it means that the regression model variation fails to explain the independent variable . Otherwise, if F_0 ($F_{\text{statistic}}$) > (F_{table}) the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. If this condition happens it the model regression variation successfully explains the independent variable (Gujarati, 2003).

F statistic equation, is;

$$F = \frac{R^2/(K-1)}{(1-R^2)/(N-K)} \qquad (3.18)$$

In which:

K = total estimation of parameters including the constant inside

N = total observation

In the significant level of 5 %, the requirement criteria are below;

1. Suppose from this research results in F_0 ($F_{\text{statistic}}$) < (F_{table}), the that null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. If this condition happens, the regression model variation fails to explain the independent variables.
2. Otherwise, if F_0 ($F_{\text{statistic}}$) > (F_{table}) the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. If this condition happens the model regression variation successfully explains the independent variables.

c. Individuality Coefficient Regression Test (t test)

t test goals is to determine the significance of independent variable individual influence an dependent variable. The hypotheses are below:

$H_0 : \beta_1 = 0$

$H_1 : \beta_1 \neq 0$

Suppose t_0 ($t_{\text{statistic}}$) < (t_{table}) the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. If this condition happens the model that is used is not good, because the independent variable could not be explained by the dependent variable or, it's not significant. Otherwise, if t_0 (*t*

$_{\text{statistic}}$) > (t $_{\text{table}}$), the independent variable is success fully explains the dependent variable perfectly, or it's significant (Gujarati, 2003).

d. Determination Coefficient Test of R^2

R^2 test goal, is to show whether independent variables are good to explain the dependent variable. R^2 values are 0-1 ($0 < R^2 < 1$). Suppose R^2 value = 1, it means that the independent variable perfectly explains the dependent variable. Otherwise, suppose R^2 value = 0, the independent variable is not strong enough to explain the dependent variable. The basic weaknesses in using this determination coefficient it's bias to dependent variable. R^2 will increase no matter the independent variable impact significant or not to dependent variable, because of that reason so many researchers suggest to use adjusted R^2 while regress the best of regression model. Adjusted R^2 is very different from R^2 value. R^2 value can increase and decrease if one of the independent variables is added into the model. The main purpose of this test is to measure how the model can explain the independent variable variation.

CHAPTER IV

FINDINGS AND ANALYSIS

4.1 Description of Research Objects

ASEAN is a regional organization in South East Asia. It was established in 1967 under the Bangkok Declaration, with five original member countries: Thailand, Malaysia, Singapore, the Philippines and Indonesia. Latter it is called ASEAN 5. Brunei Darussalam joined in ASEAN in 1984. ASEAN then is called ASEAN 6, with relatively developed economies in Southeast Asia. Now ASEAN has ten member countries with Vietnam joining in 1995, Laos and Myanmar in 1997 and Cambodia in April 1999. The latest 4 members are called ASEAN 4, or CLMV. The whole ASEAN member countries are called ASEAN 10, and if Vietnam and Laos are not included, it is called ASEAN 8. Nowadays, the ASEAN region has a population of about 500 million, a total area of 4.5million square kilometers, a combined gross domestic product (GDP) of US$737 billion, and a total trade of US$720 billion. ASEAN FTA (AFTA) is the earliest FTA in Asia, which was initiated in 1992 (Yi, 2005).

Different from the two major regional integrations respectively in Europe and the North Americas, EU faced internal pressure politically in Europe internal security issue, namely to restrain Germany, and external pressure politically from former Soviet Union, and Economically from the U.S. , ASEAN creation was not necessarily logical. If one considers the circumstances of the five original countries, each of which was widely diverse, and all of which were linked to

external powers, mainly through former colonial channels. It is doubtful whether a clear identity as ASEAN or Southeast Asia, for that matter existed at the beginning. This was because that almost every original ASEAN member nation had recently gained independence from external powers, and had the extremely strong desire to be independent both in politics and economy. One may imagine, therefore, that ASEAN was a creation of the Cold War, supported by the U.S. strategy for a political and economic formation at the regional level. Consequently, it is not surprising that ASEAN had only limited success during its early era. Although the member countries of ASEAN are geographically close, the interdependence in economy among ASEAN was minimal. Almost every ASEAN member nation adopted the import substitution model which is based on a closed economy. In addition, ASEAN was not established for economic purpose, so in the establishment stage, economic integration among ASEAN almost did not exist. Estimates during the establishment stage showed that the share of intra-ASEAN trade of the total trade of the member countries was between 12 and 15 percent. In summary, during the establishment stage of ASEAN, ASEAN was dominated by ideology, mainly for the purpose of political solidarity against communism rather than for the purpose of economic integration, although from neither aspects could the integrations be considered successful. Although the member countries of ASEAN are geographically close, the interdependence in economy among ASEAN was minimal. Almost every ASEAN member nation adopted the import substitution model which is based on a closed economy. In addition, ASEAN was not established for economic purpose, so in

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After the end of the Vietnam War in 1975, with the retreat of U.S. power in southeastern Asia, the antagonism in ideology became less strong. The ASEAN member nations turned more to regional security concerns and domestic stability. Border disputes had long existed among ASEAN countries: Malaysia and Indonesia over two islands, Malaysia and Singapore over an island, Indonesia and the Philippines over some islands, the Philippines, Vietnam and China over some islands in the South China Sea. A domestic instability had also long existed in most of the member nations. There were many parties and religious factions in almost every member country. Some countries were controlled by military government, some countries cabinets were changed frequently, other countries anti-government armed forces and terrorist activities were furious. This led to the first heads of government's meeting held in Bali in 1976 and the conclusion of the Treaty of Amity and Cooperation in Southeast Asia (TAC). The TAC is an important non-aggression political pact of ASEAN. It declared the following fundamental principles:

- Mutual respect for the independence, sovereignty, equality, territorial integrity, and national identity of all nations;
- The right of every State to lead its national existence free from external interference, subversion or coercion;
- Non-interference in the internal affairs of one another;
- Settlement of differences or disputes by peaceful manner;
- Renunciation of the threat or use of force; and
- Effective cooperation among themselves.

The TAC showed that domestic affairs should be free from external interference and that mutual disputes should be settled free from the force and threat. This demonstrated that the TAC was a political accord of landmark meaning, because it displayed the strong determination to be free from external powers interference, and to be respected and independent, dealing with the internal affairs among ASEAN through equal dialogue and peaceful means. This established a good political basis for southeastern regional security. Due to the TAC, ASEAN s regional security improved and the Regional security conditions could usually build confidence in promoting regional economic integration. In 1977, immediately after the conclusion of the TAC, the ASEAN member countries signed the Preferential Trading Arrangement (PTA) of 1977, which accorded tariff preferences for trade among ASEAN economies, aiming at enhancing the economic cooperation among ASEAN. Ten years later, an Enhanced PTA Program was adopted at the Third ASEAN Summit in Manila further increasing intra-ASEAN trade (Yi, 2005).

Substantial Integration Stage (1992-1997): from the Launching of AFTA to before the Eruption of Southeastern Asia Financial Crisis. During this period, the ASEAN member countries signed the ASEAN Declaration on the South China Sea, Manila, in July 1992. In the Declaration, Article 1 emphasizes by peaceful means, without resort to force to resolve all sovereignty and jurisdictional issues pertaining to the South China Sea; Article 3 resolves to explore the possibility of cooperation in the South China Sea relating to the security of maritime navigation and communication, protection against pollution of the marine environment, coordination of search and rescue operations, efforts towards combating piracy and armed robbery as well as collaboration in the campaign against illicit trafficking in drugs ; Article 4 advocates a code of international conduct over the South China Sea based on the principles contained in the TAC ; art. 5 invite all parties concerned to subscribe to this Declaration of principles. Article 5 is worth notice: because China is a major party in the South China Sea. The Declaration, in fact, invites China to negotiate with the party concerned South China Sea among ASEAN. In December 1995 in Bangkok, in the foreign ministers meeting, ASEAN concluded the Treaty on the Southeast Asia Nuclear Weapon-Free Zone. It was obvious that ASEAN s political integration still centered surround eliminating the regional security concerns. As the Treaty declared that the establishment of a Southeast Asia Nuclear Weapon-Free Zone will contribute towards strengthening the security of States within the Zone. In January 1992 at the Fourth ASEAN Summit in Singapore in January 1992, the Framework

Agreement on Enhancing Economic Cooperation was signed, which included the launching of a scheme toward an AFTA, aiming at the elimination of tariff and non-tariff barriers and promoting trade liberation among the member countries. In 1995, the Fifth ASEAN Summit held in Bangkok adopted the Agenda for Greater Economic Integration, which included the acceleration of the timetable for the realization of AFTA from the original 15-year timeframe to 10 years. Economic integration in this period proved greatly successful. ASEANs economies developed at a surprising speed. Within the three years from the launching of AFTA, exports among ASEAN countries grew from US$ 43.26 billion in 1993 to almost US$ 80 billion in 1996, an average yearly growth rate of 28.3 percent 26. In the process, the share of intra-regional trade from ASEANs total trade rose from 20 percent to almost 25 percent. Tourists from ASEAN countries themselves have been representing an increasingly important share of tourism in the region. In 1996, of the 28.6 million tourist arrivals in ASEAN, 11.2 million or almost 40% came from within ASEAN itself. During this period, ASEANs economic development obtained a strong reputation. It was called the miracle of Southeast Asia in the world. Correspondingly, ASEANs political status rose too (Yi, 2005).

Break of ASEAN Regional Economic Integration by the Southeast Asia Financial Crisis In February 1997, the Southeast Asia financial crisis (the financial crisis) erupted. The ASEAN economies were hit hard and suffered great losses, and at the same time the crisis had tremendous impacts on other Asian countries and regions and later on developed countries, including the U.S., Japan and Europe. The total economic loss of South Korea, Thailand, Malaysia and

Indonesia approximated US$ 600 billion, the GDP per Capita in US$ of these countries decreased to the level of ten years ago. During only a few months, the currency in these countries was devalued by 50 percent, or even 80 percent. The financial crisis fully exposed the long-established weakness of ASEAN s regional economy. They are:

1) Heavy Economic Dependence on the U.S. and Japan

   First, ASEAN member countries long and excessively depended on foreign capital, especially U.S. and Japanese capital, and the efficiency to make good use of the foreign loans was not high. So if the international balance of the ASEAN countries was a deficit, then the national currency should have devalued in terms of its real value. However, the national currency of most ASEAN s countries was pegged to U.S. dollar one way or another. Thus, when international balance of payments kept a deficit for a long time, the exchange rate of national currency with US dollar could not be maintained. The financial crisis erupted. Second, the previous rapid growth of ASEANs economy had been based on the export-processing model. In the 1970s and the 1980s, member countries processed downstream electronics products for Japan; when ASEAN went into the 1990s, the Japanese economy began to decline and the U.S. economy began to rise, ASEANs export became dependent on the U.S. market. Once the demand of the two markets was insufficient, the ASEANs economy would be affected seriously.

2) Excessively Open Capital Market

The capital market in ASEAN country was excessively open. One World Bank study placed Malaysian and Thai trade policies as among the most open in developing economies. Opening domestic markets to outside money (under an early round of pressure from the IMF [the International Monetary Fund) brought a deluge of short term foreign investment and spurred heavy short-term borrowing from abroad, fueling a building boom. Take Thailand for example, by the mid 90s, a speculative binge in everything from high-rise office towers to condos to gold courses accounted for nearly 40% of growth in Thailand. 34 When the real estate bubble burst, conditioning the rather open capital market, too much capital rushed out, too quickly. The excessive inflow of capital reversed itself and fled with little regard for the actual strength of a particular economy.

3) Weak Intra-Regional Economic Interdependence

The economic interdependence among the member countries was weak. The intra regional trade among ASEAN accounted for a small portion of the total trade of ASEAN, about no more than 25 percent, far less than the level of 40% plus of intra-regional trade among EU and NAFTA; moreover, such small portion was mainly produced between Singapore and Malaysia,36 the intra-regional trade among other ASEAN s countries was even smaller. Therefore once the demand outside ASEAN sharply declined, the intra-regional demand could not be spurred to absorb part of

the products diverted from the exportation, and then the national and regional economy collapsed together.

4) Similarities in Industrial Structures Southeastern Asian export industries lay in the bottom layer of the global vertical division system, gathering a large number of labor-intensive and half capital-intensive industries. It became the weakest part in the global economy chains. ASEAN s member countries repeated the same development model: absorbed foreign capital, invested in the export-processing industries, and their products tended to be alike. Whether in their domestic economy or even in the intra-regional economy among ASEAN, the development layout of industrial hierarchies and diversities was not formed; almost none of the production chains were wholly shaped. When the global economic structures were adjusted and such adjustments caused the demand for ASEAN s exports to greatly decline, ASEAN s downstream processed products would be superfluous and ASEAN s economy would be damaged seriously. Due to the financial crisis, ASEAN s competition in exportation and attraction of foreign investment was unfavorably affected immensely. In addition, because its member countries had to engage in dealing with domestic problems caused by the financial crisis, the mutual cooperation and coordination among ASEAN were suspended. As a result, ASEAN s status and influence both in economy and politics declined rapidly either in Asia or in the world.

The financial crisis provided ASEAN with many lessons. If in the future we are in retrospect of the process of ASEAN s regional economic integration and even of

the later East Asian regional economic integration, we will discover that the financial crisis undoubtedly acted as a watershed and even a catalyze. Before the financial crisis, the rapid economic growth of ASEAN mainly depended on foreign capital and markets, based much less on intra economic interdependence among ASEAN and their domestic markets. The member countries had no strong motivations to enhance a complete integration to close their relationship in economy. The financial crisis confronted ASEAN with many new issues for discussion. First, the global IMF failed in the financial crisis. It suggested that a regional monetary and financial cooperation would be necessary. Second, unlike the developed countries, the door of the non-developed countries capital market can only open step by step, rather than too fast. Third, the simplification of monetary policy, which was only pegged to U.S. dollar, should be changed, because once the U.S. dollar s value fluctuates badly, the concerned countries monetary and financial system will suffer from great influence. Therefore the monetary policy should be diverse, for example, adopt a package of pegged moneys. Besides, the similarities of regional industrial structures and weak intra-regional economic interdependence were viewed as the in-depth causes of the financial crisis. It was considered that establishing among ASEAN the diverse and hierarchical economies, stretching the production chains, strengthening economic complementarities and enhancing the intra-regional economic interdependence will effectively form regional competitive force to resist to the external economic impacts, making ASEAN a regional trade bloc in a genuine sense. So it was a logical consequence that after the financial crisis ASEAN began the complete

intra-regional economic integration in a variety of areas to enhance the intra-regional economic interdependence (Yi, 2005).

In responding to the crisis, ASEAN heads of governments in December 1997 set out their ASEAN 'Vision 2020' statement. The vision contained a message in favor of moving towards closer cohesion and economic integration. It was soon followed by an action plan concluded in the following year at the ASEAN summit in Hanoi. The action plan among other things, calls for a strengthening of the financial system in the region to maintain regional macroeconomic and financial stability, and to intensify cooperation on money, tax and other financial related matters. Prior to East Asia crisis, economic integration in East Asia has been enhancing via the market driven forces such as cross-border trade, FDI (foreign direct investment) and finance. Over the past 20 years, international trade and FDI activities have expanded rapidly through multilateral international institutions such as World Trade Organization (WTO), Asia Pacific Economic Cooperation (APEC) as well as unilateral (or multilateral) trade liberalization processes. Nevertheless, the patterns of economic cooperation in East Asian countries have been changed, especially after the East Asia financial crisis erupted in mid-1997. The rapidly changing international environment and East Asia crisis have emerged a common interest amongst East Asia countries in creating a strong impetus for regional cooperation. This has led to the Chiang Mai Initiative (CMI) agreement on bilateral swaps and discussion of the possibility of creating a monetary union among the ASEAN+3. Indeed, there have been few attempts proposed to create cooperative frameworks that help to prevent and

manage future currency crises and to promote economic efficiency by developing sound financial systems. Japan, for example, has proposed to create an Asian Monetary Fund (AMF) in September 1997. The members of this Fund would contribute some portion of their international reserves to a central fund, which would be utilized to provide a financial assistance to countries affected by external crises such as financial and currency crises. However, the United States, China and the IMF against the establishment of the AMF proposal on two reasons: soft conditionality and duplication. As a further step in promoting Asian economic integration, Japanese finance minister Miyazawa has made a proposal that is called “New Miyazawa Initiative” in October 1998, which aimed to set up a financial assistance scheme totaling 30 billion US dollars. This Initiatives, however, has met with strong criticism because the proposal is too Japan-centered, and the attitude of Japan in regional initiatives is rather ambiguous (Moon, 2000 (excerpt from Choo and Choong, 2009)). Although this proposals were rejected, there were few more successful initiatives have been proposed towards a closer monetary cooperation in Asian. For example, a conference was held in Manila in November 1997, which consists of deputy finance ministers and central bank governors from 14 mostly Asian countries. The outcome of the conference was the establishment of Manila Framework Group (MFG), a new framework to enhance Asian Regional cooperation and to promote financial stability in the region. In addition, the ASEAN finance ministers have agreed to establish the ASEAN Surveillance Process (ASP) in October 1998 to encourage policy dialogue based on the peer review and mutual interest among ASEAN member

countries. In November 1999, China, Japan, and South Korea have been invited to join ASP, which making “ASEAN+3” reality in financial surveillance (Choo and Choong, 2009).

To reinforce the Hanoi action plan in order to achieve this goal, ASEAN nations have also moved forward by looking at a wider region in terms of economic and financial cooperation through the Chiang Mai Initiatives (CMI) that was launched in May 2000. The initiative aimed to develop a network of bilateral swap agreements (local currency to US dollar or Japanese) among Northeast Asian countries, and strengthening an intra-ASEAN swap agreement. In May 2002, bilateral swap agreements between Japan, Korea, Thailand, Malaysia, Philippines, and China have been initiated. Also the ASEAN swap agreement was extended to cover all the 10 member countries. The CMI represents the first milestone towards constructing a coordinated intervention policy and currency arrangement regionally. Nevertheless, this step is more likely to be more a case of “pooling reserve” in dealing with external instability or crises than a commitment to bilateral intervention to stabilize regional bilateral exchange rates. Obviously, financial cooperation has seen some positive progress among East Asia countries; however, incentives for monetary cooperation are still lack (Choo and Choong, 2009). Although some economic indicators are agreeable, China, Japan and Korea do not appear to be economically suitable for monetary cooperation with ASEAN (Jikang and Yin, 2005). The uncertain economic times ahead however merit discussion on how further integration could help the organization maintain economic stability while raising its regional competitive profile. This study finds

that while significant reforms can be made in the absence of such a union, there are likely to be considerable benefits that apply only after full integration of ASEAN takes place (Chaudhury, 2009).

4.2 Data Analysis

4.2.1 Raw Data Analysis

Data that are used in this research is a secondary data, which is collected in a form of literature data that are related to this research. Shape literature data that we use in this research are; note, document, and also article data. All the data that we gained latter we will manage and process it in order to match it to answer out research question and objectives. For this research purpose we require data from UNDIP (Diponegoro University) Library at Semarang City to get the International Financial Statistics of IMF 2004 and we also surfing searching data on-line through internet until finally we found Nation Master, UN data, Asian Development Bank, CIA World Fact book that help us to complete the data that we gained before from UNDIP library. Data that we have collected from International Financial Statistics of IMF 2004 and Nation Master, UN data, Asian Development Bank, CIA World Fact book are; 1) Consumer Price Index (CPI), 2) Nominal exchange rate, 3) Export, 4) Import, 5) Population, 6) Gross Domestic Product (GDP).

Methodology that used in this research consists of the EMU (European Monetary Union) model principle in launching their single currency Pitchford and Cox, 1997 (excerpt from Rasheed and Ahmed, 2007) and the sigma convergence model (Chowdhury, 2004 (excerpt from Rasheed and Ahmed, 2007). Pitchford

and Cox, 1997 (excerpt from Rasheed and Ahmed, 2007) edited the European Monetary Union (EMU) principles for launching single currency for Europe. According to the editors the indicators like real income per capita, call money rate, consumer price index, real exchange rate, exports, imports and balance of payments are vital. In our study we have included the volume of trade both for the country specific and as a world relative index. They used the following data series to apply the beta convergence criteria to evaluate the possibility of the formation of a single currency in the Asia. The list of the selected variables is as follows;

xiv. Consumer Price Index (CPI)

xv. Real Exchange Rate in US dollars (RER)

xvi. Growth rates of Foreign Exchange Reserves (GFER)

xvii. Growth rates of Real Volume of Trade (GRVT)

xviii. Growth rates of Real Relative Volume of Trade (GRRVT)

xix. Growth rates of Per Capita Real GDP at factor cost (GRYPC)

Where;

GRYPC = Growth rate of (GDP/ (population))

RER = Nominal Exchange Rate *CPI_{US} / CPI

GRVT = Growth rates of {(Exports + Imports)/CPI}

GRRVT = Growth rates of {(Exports + Imports)/CPI}/

{(Exports $_W$ + Imports $_W$)/CPI_W}

Note;
W = indicating world

US = United State country

Raw data in this research is gain through several process calculations of data collection from secondary data source, as describe on above explanation, because of that reason data collecting process journey is not as simple as imagine, and here are the raw data analysis of this research study;

(7) Consumer price indices (CPI) of ASEAN-10 Analysis (1992-2009)

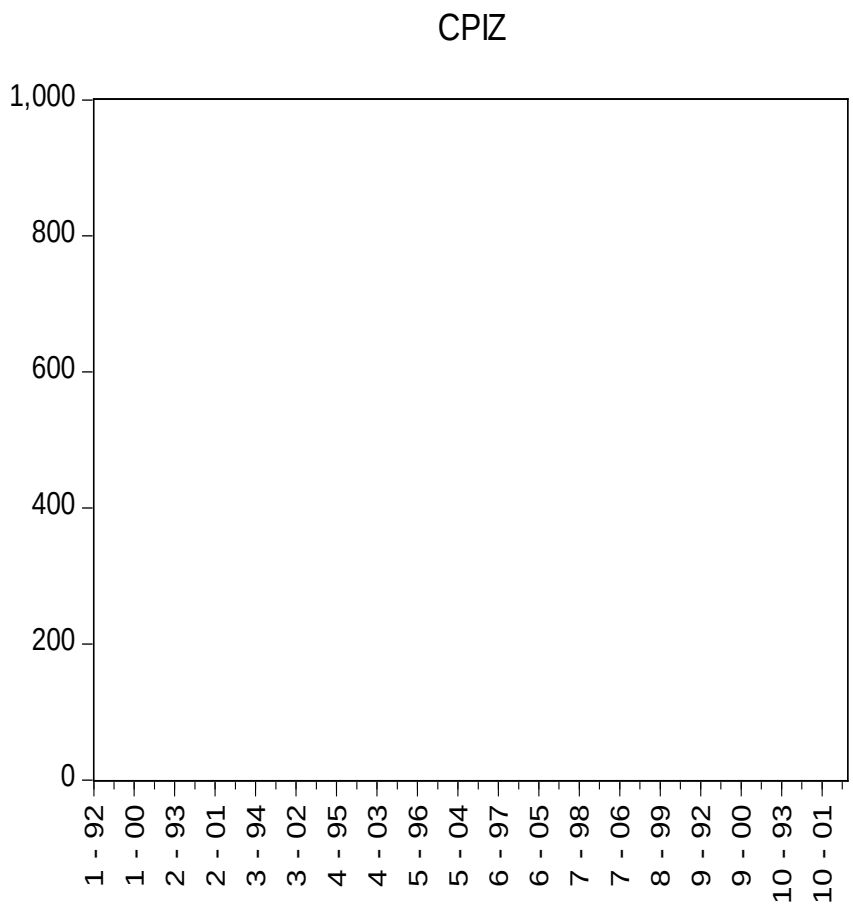
Consumer price indices in this research means as an inflationary indicator that measures the change in the cost of a fixed basket of products and services, including; housing, electricity, food, and transportation. Consumer price indices is also mean as an index of prices used to measure the change in the cost of basic goods and services in comparison with a fixed base period, which is also called, cost-of-living-index. In this research CPI of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2006 as CPI z and 1995-2009 as CPI w.

Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.1 and 4.2 is a combined a cross sectional graph which displays separate lines for each cross-section in a single graph. Figure 4.3 and 4.4 is individual cross sections displays separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph are a single graph containing the summary of statistics for each period.

Figure 4.1 and 4.2 show that in general the summary of statistics of both periods of observation are similar. It means that the selection period is good for regression.

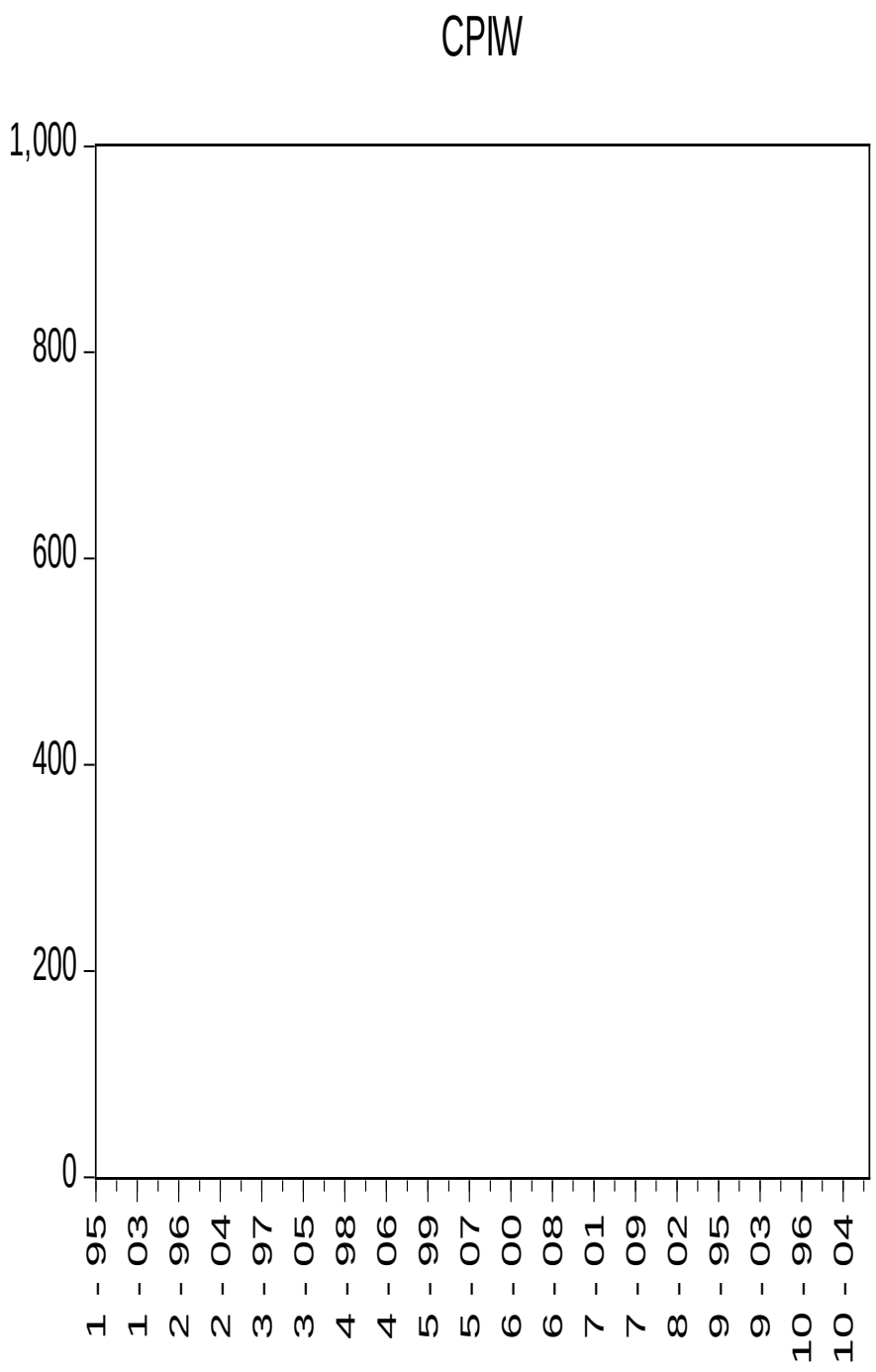
Indonesia CPI is described as the only one which has the same Individual cross sectional graph on both periods of time. Indonesia CPI shape is stays the same, whether it observed far from crisis or close to crisis year (see Figure 4.3 and 4.4).

Figure 4.1
CPI Combined Cross Section Grap



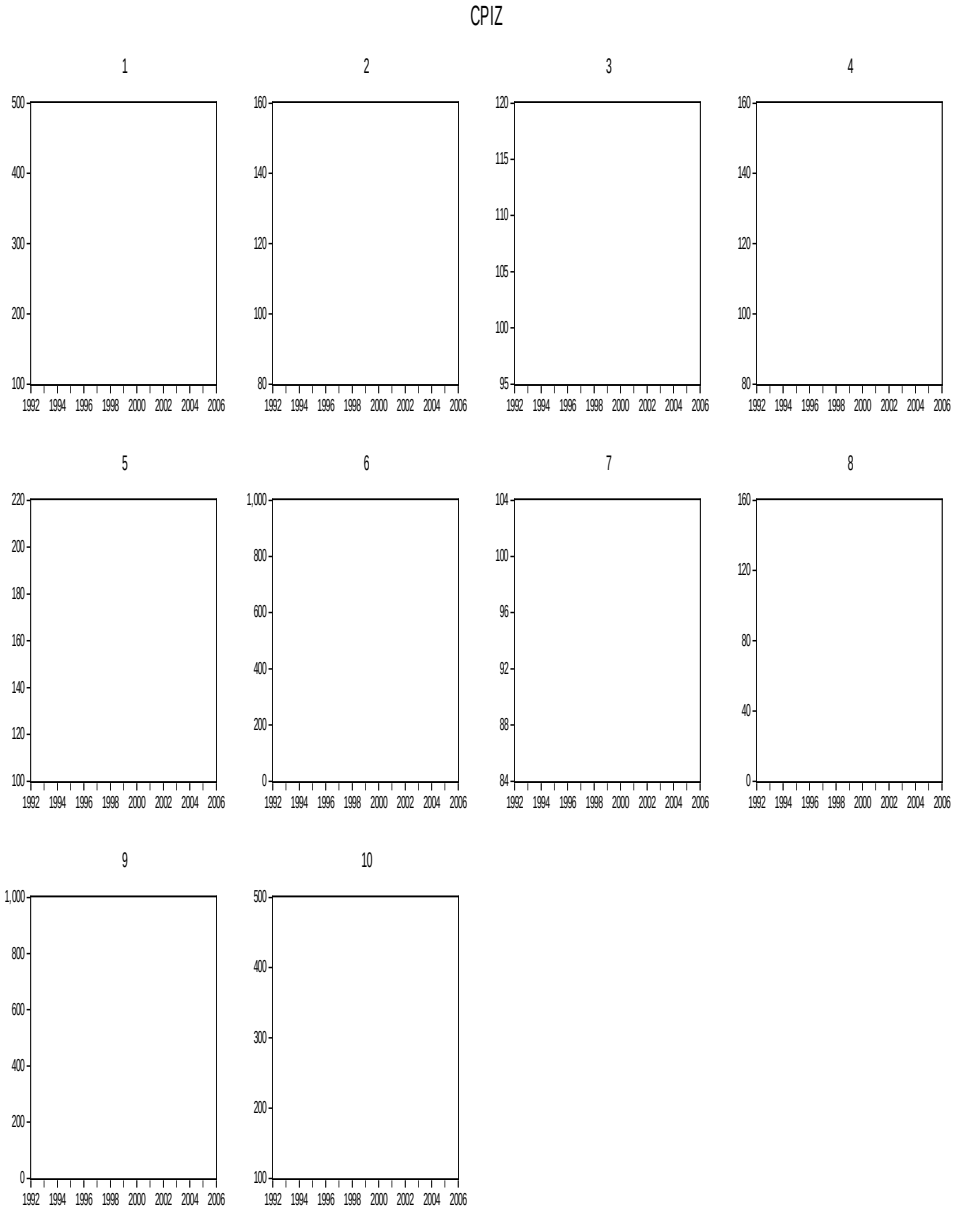
Source: Eviews-6, 2

Figure 4.2
CPI Combined Cross Section Graph (1995-2009).



Source: Eviews-6, 2010.

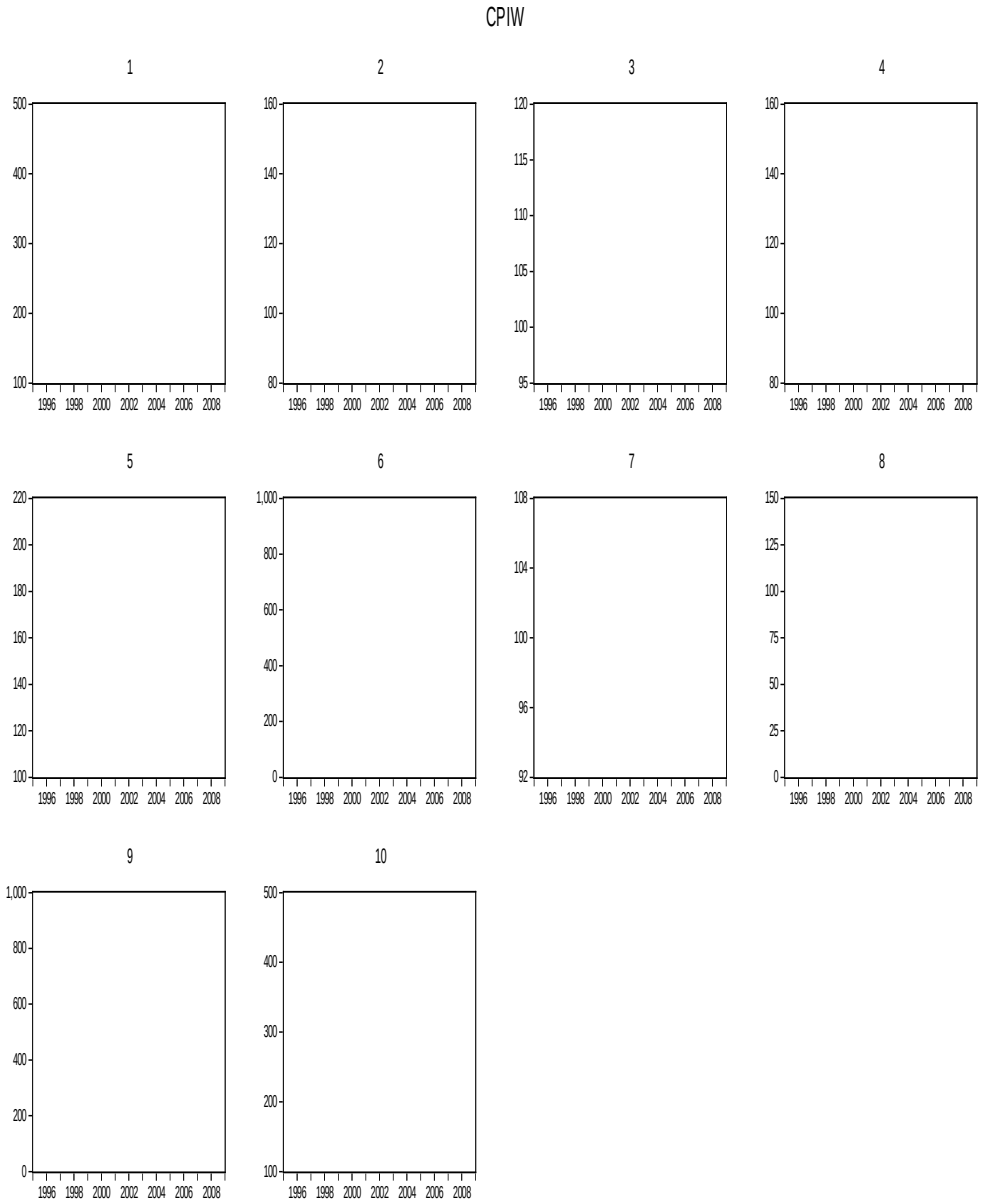
Figure 4.3
CPI Individual Cross Section Graph (1992-2006).



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

Figure 4.4
CPI Individual Cross Section Graph (1995-2009).



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

(8) Real exchange rates in US Dollar (RER) of ASEAN-10 Analysis (1992-2009)

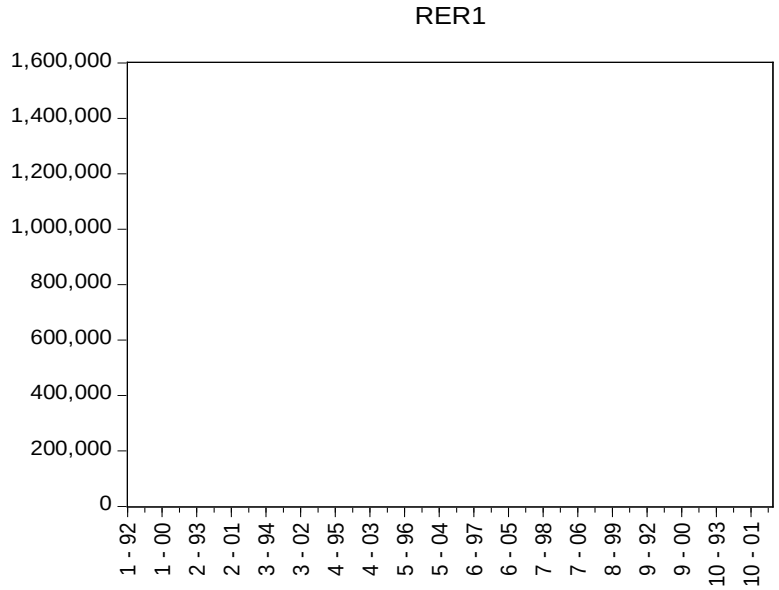
Real exchange rates in US Dollar in this research means as the price of one currency expressed in terms of U.S. Dollar which is adjusted for inflation. In this research RER of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2006 as RER 1 and 1995-2009 as RER 2.

Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.5 and 4.6 are cross sections graph which displays separate lines for each cross-section in a single graph. Figure 4.7 and 4.8 are individual cross sections, which display separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph are a single graph containing summary statistics for each period.

Figure 4.5 and 4.6 show that in general the summary statistics of both periods of observation are similar, it means that the selection period is good for regress.

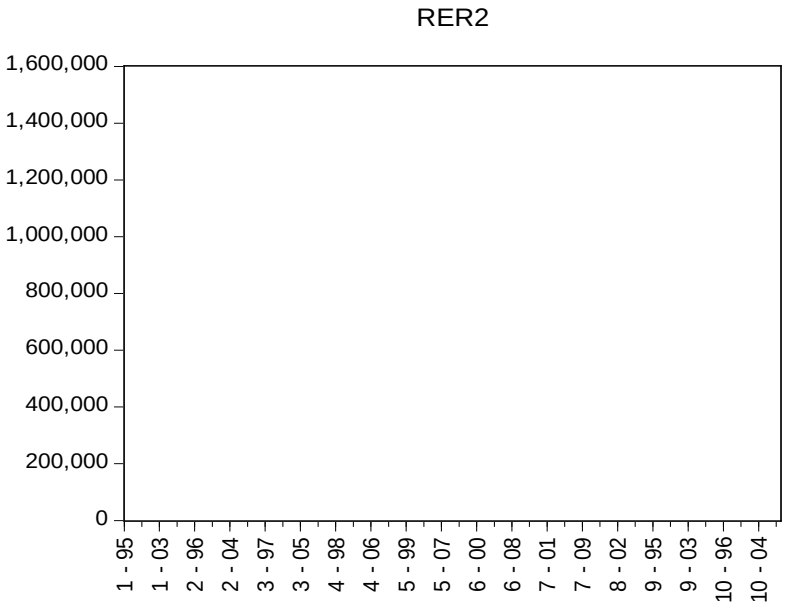
Malaysia, Singapore, and Thailand RER's are described as the only countries which have the same Individual cross section graph on both periods of time, whereas: Malaysia, Singapore, and Thailand RER's shape stay the same, whether it was far from crisis or close to crisis year (see Figure 4.7 and 4.8).

Figure 4.5
RER Combined Cross Section Graph (1992-2006).



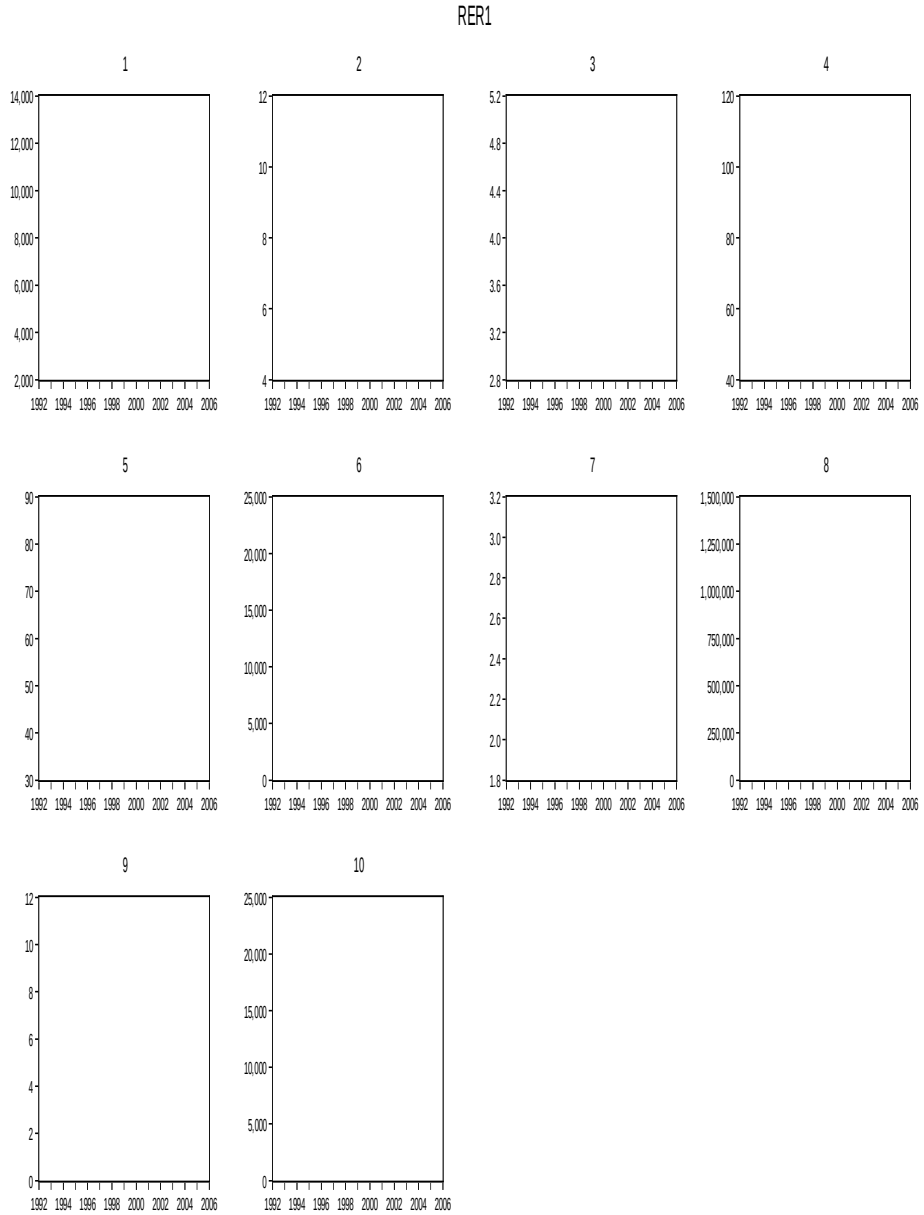
Source: Eviews-6, 2010.

Figure 4.6
RER Combined Cross Section Graph (1996-2009)



Source: Eviews-6, 2010.

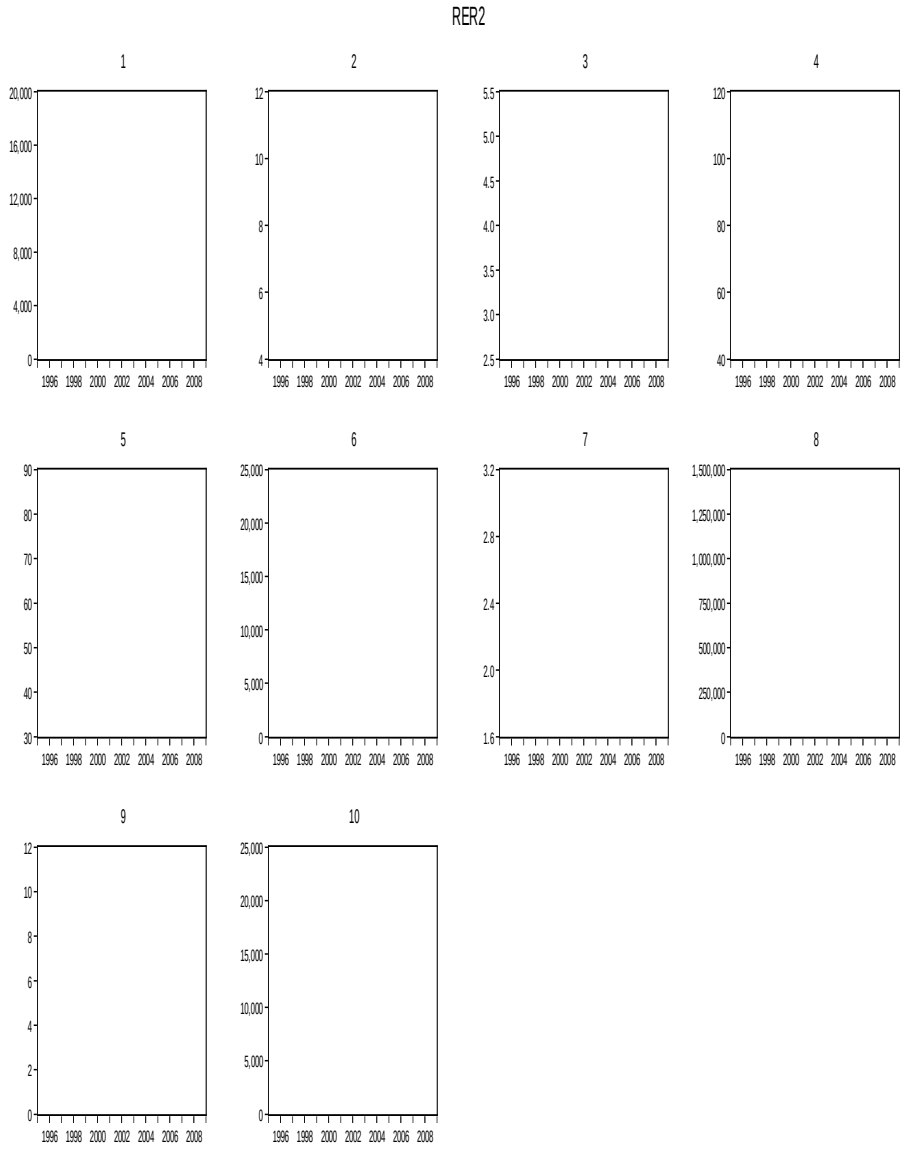
Figure 4.7
RER Individual Cross Section Graph (1992-2006).



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

Figure 4.8
RER Individual Cross Section Graph (1995-2009).



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

(9) Growth rates of foreign exchange reserves (GFER) of ASEAN-10 Analysis (1992-2009)

Growth rates of foreign exchange reserves in this research means the amount of increase a deposit of a foreign currency of other countries as assets allow government to keep their currencies stable and reduce the effect of economic shocks. In this research GFER of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data in this research study. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2006 as GFER 10A and 1993-2007 as GFER 10B.

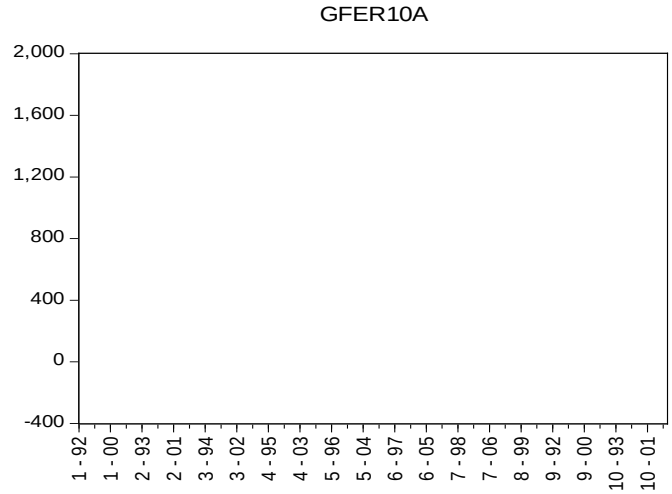
Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.9 and 4.10 is a combined cross sectional graph which displays separate lines for each cross-section in a single graph. Figure 4.11 and 4.12 are individual cross section which displays separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph a single graph containing summary statistics for each period.

Figure 4.9 and 4.10 show that in general the summary statistics of both periods of observation are similar, it means that the selection period is good for regress.

Indonesia GFER for regression is described as the only country which has the same Individual cross section graph on both periods of time, whereas

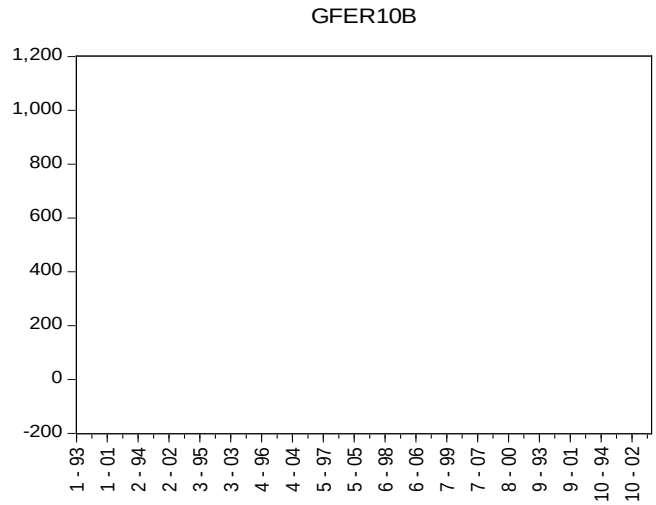
described that Indonesia GFER's shape stay the same, whether it observed far from crisis or close to crisis year (see Figure 4.11 and 4.12).

Figure 4.9
GFER Combined Cross Section Graph (1992-2006)



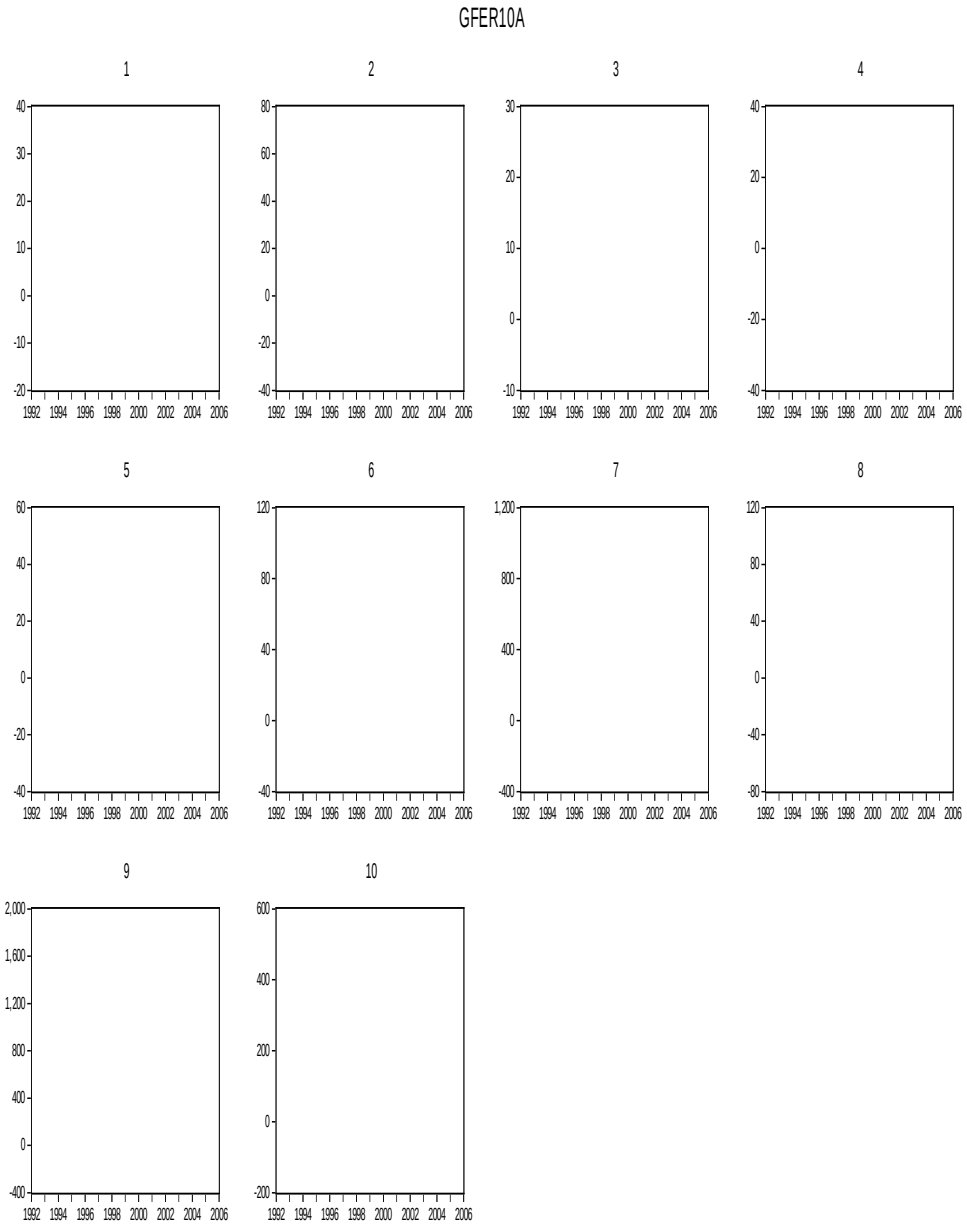
Source: Eviews-6, 2010.

Figure 4.10
GFER Combined Cross Section Graph (1993-2007)



Source: Eviews-6, 2010.

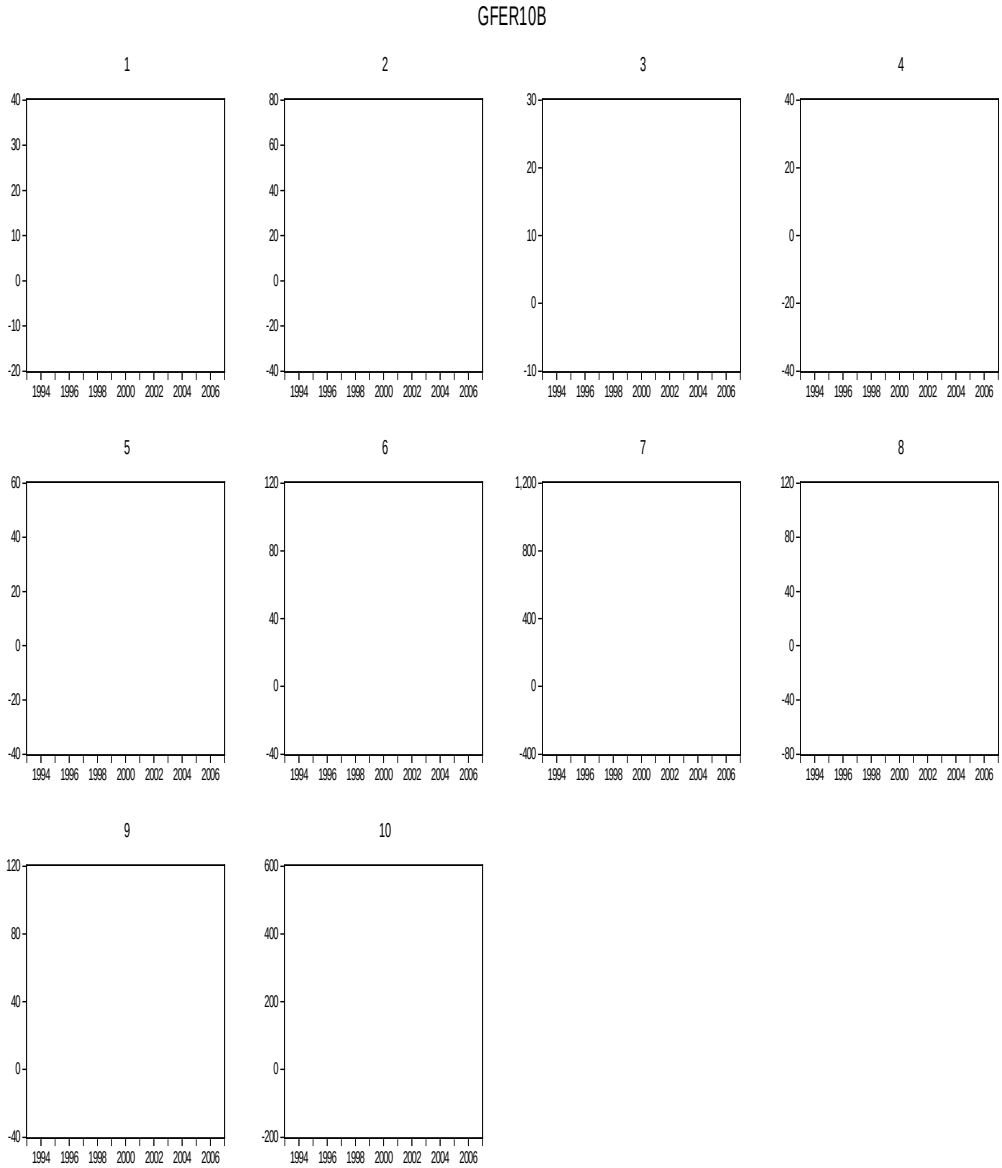
Figure 4.11
GFER Individual Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

Figure 4.12
GFER Individual Cross Section Graph (1993-2007)



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

(10) Growth rates of real volume of trade (GRVT) of ASEAN-10 Analysis (1992-2009)

Growth rates of real volume of trade in this research means the amount of increase the number of shares, bonds or contracts, traded during a given period, for a security, or an entire exchange that adjusted for inflation. In this research GRVT of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2006 as GRVT 1 and 1995-2009 as GRVT 2.

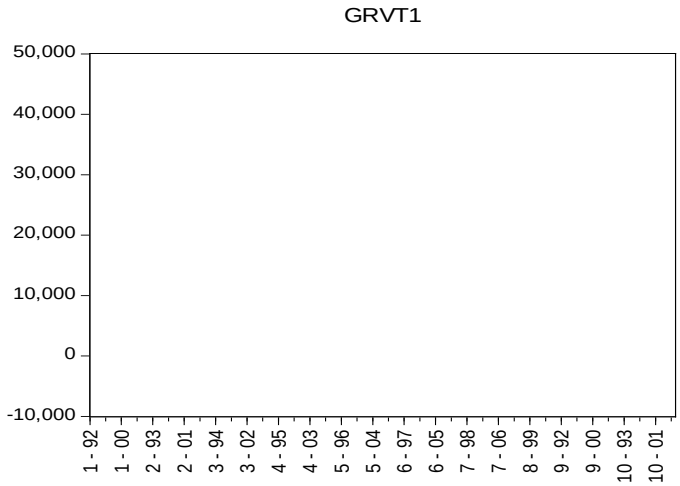
Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.13 and 4.14 are a combined a cross sectional graph which display separate lines for each cross-section in a single graph. Figure 4.15 and 4.16 are individual cross sections which display separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph are a single graph containing the summary of statistics for each period.

Figure 4.13 and 4.14 show in general the summary of statistics of both periods of observation are similar, It means that the selection period is good for regression.

All ASEAN countries that consist: Indonesia, Malaysia, Singapore, Philippines, Thailand, Vietnam, Laos, Myanmar, Brunei Darussalam, Cambodia, are dynamics GRVT individual cross sectional graph on both

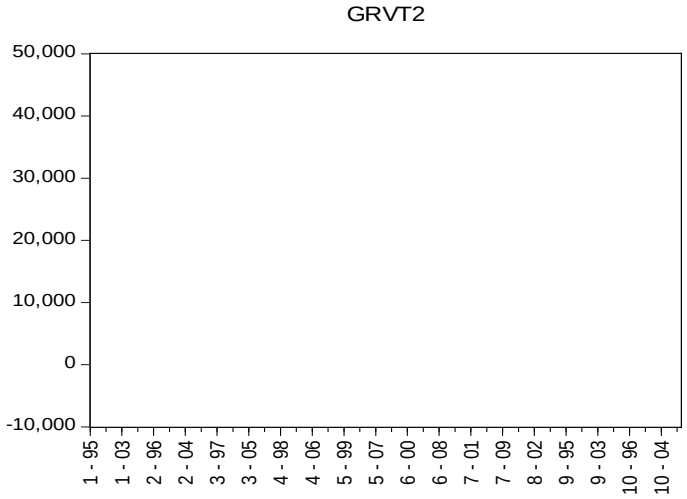
period of time, whereas described that all ASEAN countries GRVT's shape is dynamics, while it observed far from crisis or close to crisis year (see Figure 4.15 and 4.16).

Figure 4.13
GRVT Combined Cross Section Graph (1992-2006)



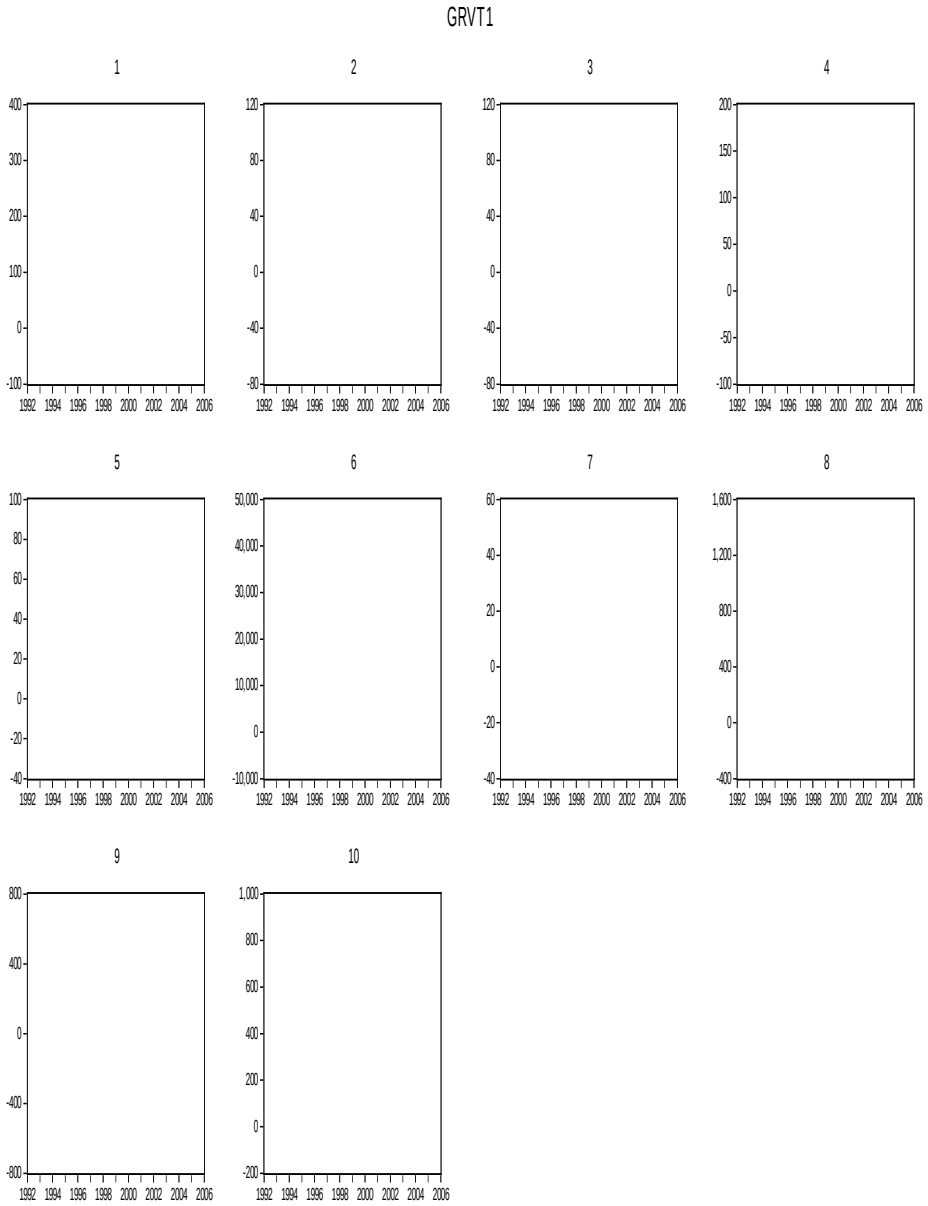
Source: Eviews-6, 2010.

Figure 4.14
GRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.

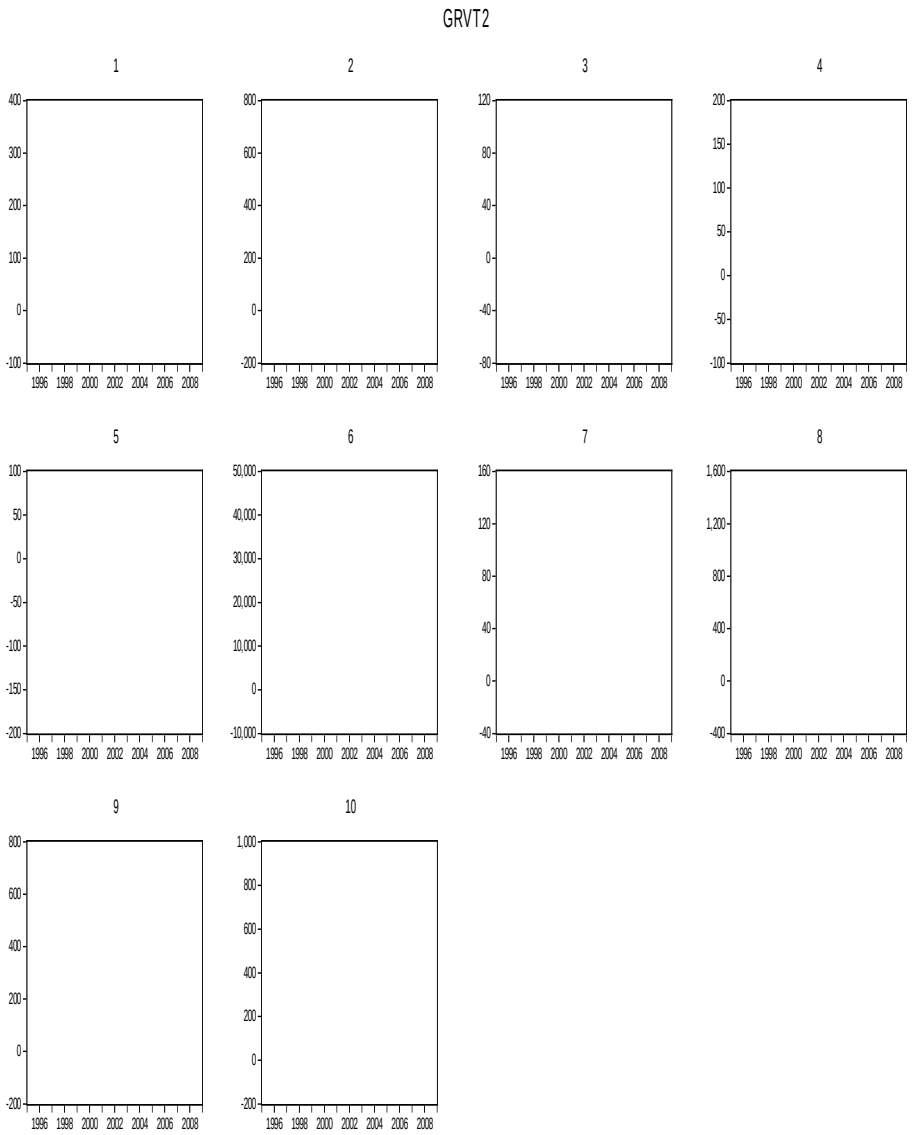
Figure 4.15
GRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

Figure 4.16
GRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

(11) Growth rate of a real relative volume of trade (GRRVT) of ASEAN-10 Analysis (1992-2009)

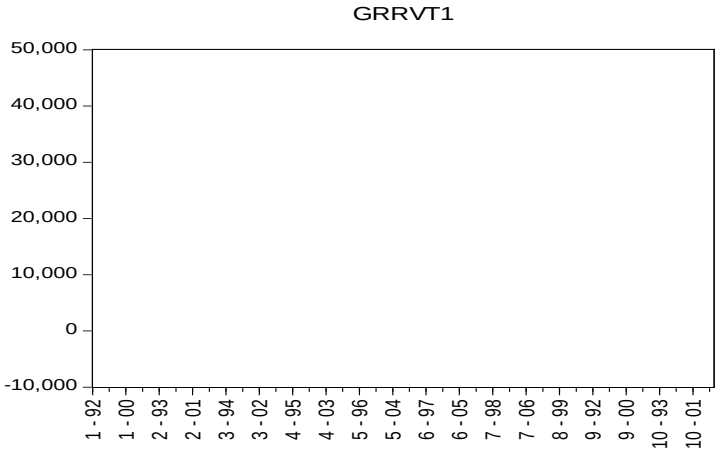
Growth rate of a real relative volume of trade in this research means the amount of increases a measurement of one investment or financial instruments value relative to another's in the number of shares, bonds, or contracts which is, traded during a given period for a security or an entire exchange that adjusted for inflation. In this research GRRVT of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2006 GRRVT 1 and 1995-2009 GRRVT 2.

Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.17 and 4.18 is a combined a cross sectional graph which displays separate lines for each cross-section in a single graph. Figure 4.19 and 4.20 is individual cross sections displays separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph are a single graph containing the summary of statistics for each period.

Figure 4.17 and 4.18 show that in general the summary of statistics of both periods of observation are similar. It means that the selection period is good for regression.

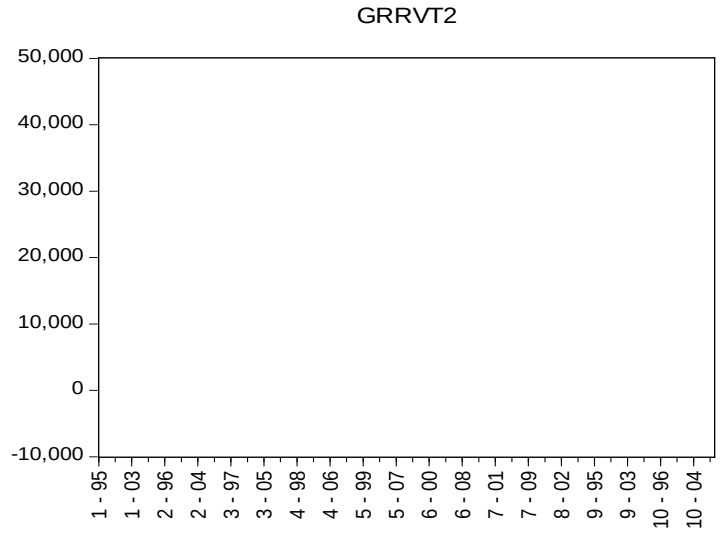
Vietnam GRRVT is described as the only countries which has the same Individual cross sectional graph on both periods of time.Vietnam GRRVT's is stays the same, whether it observed far from crisis or close to crisis year (see Figure 4.19 and 4.20).

Figure 4.17
GRRVT Combined Cross Section Graph (1992-2006)



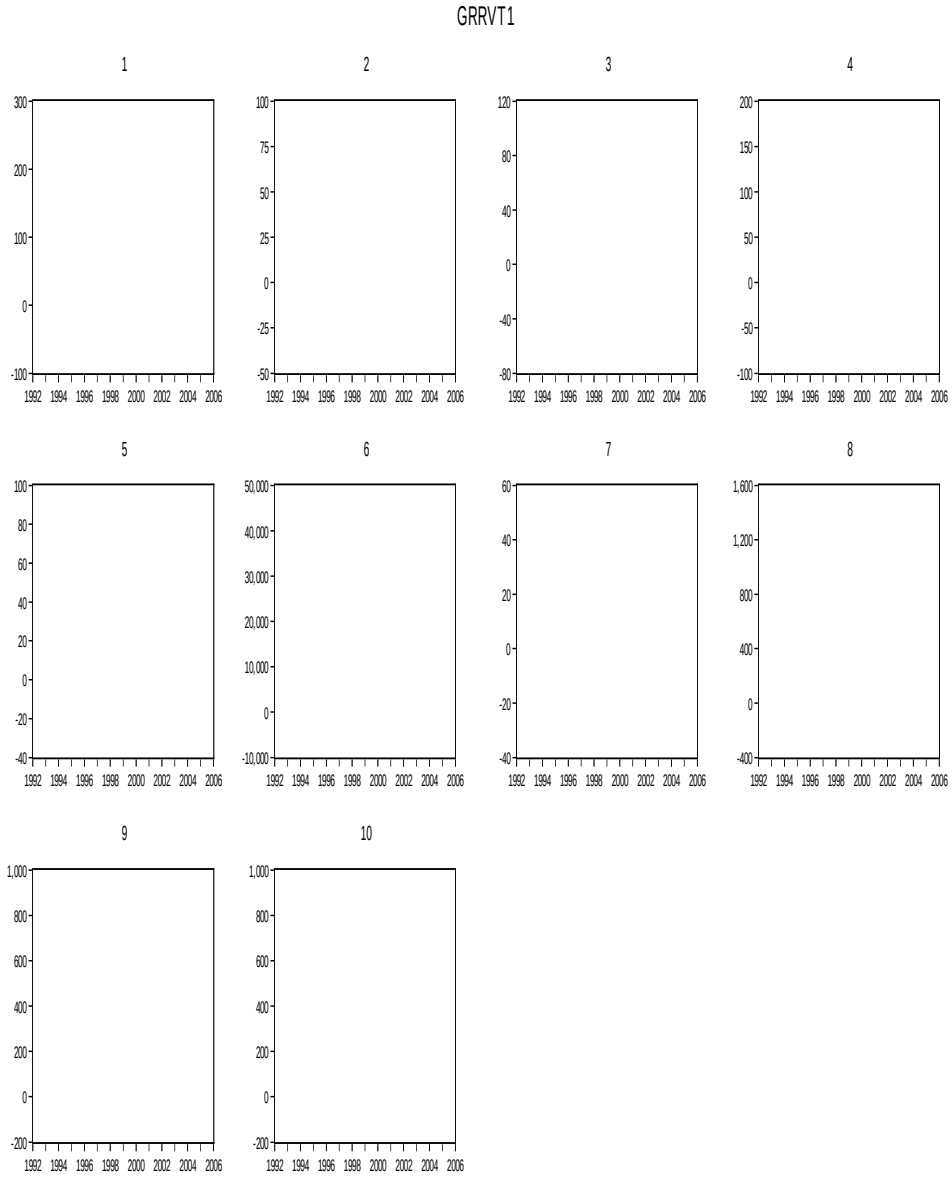
Source: Eviews-6, 2010.

Figure 4.18
GRRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.

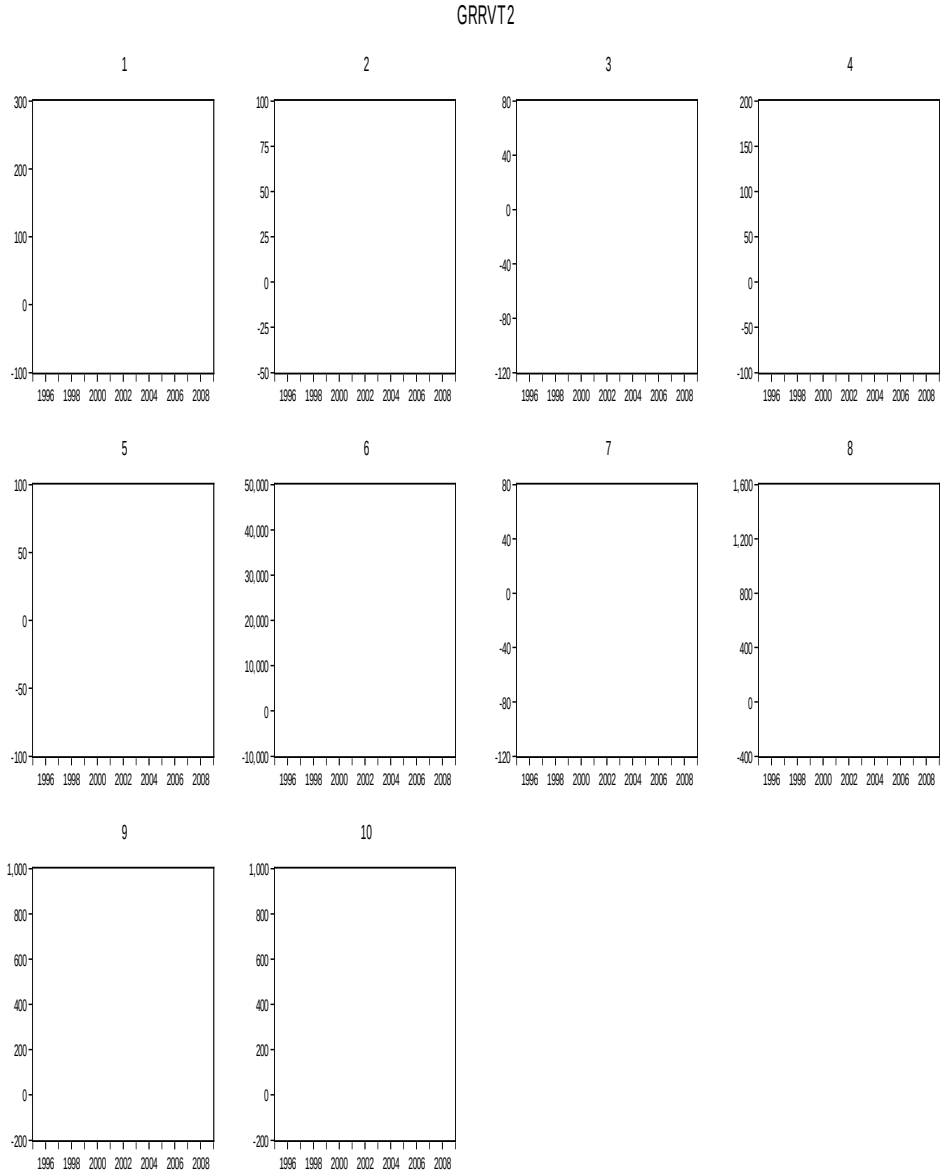
Figure 4.19
GRRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

Figure 4.20
GRRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

(12) Growth rate of real per capita GDP at factor cost (GRYPC) of ASEAN-10 Analysis (1992-2009)

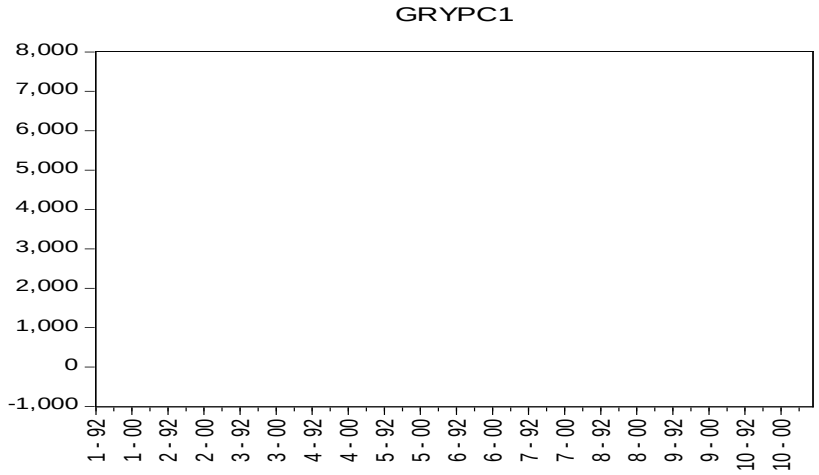
Growth rate of real per capita GDP at factor cost in this research means as the amount of increase an approximation of the value of goods produced per person in the country's GDP divided by the total number of people in the country at the total money, time and resources of a firm engaged in the business of financing accounts receivable which is the activity known as factoring with a purchase or activity that adjusted for inflation. In this research GRYPC of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2007 GRYPC 1 and 1994-2009 as GRYPC 2.

Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.21 and 4.22 is a combined cross sectional graph which displays separate lines for each cross-section in a single graph. Figure 4.23 and 4.24 is individual cross sections displays separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph are a single graph containing the summary of statistics for each period.

Figure 4.21 and 4.22 show that in generally the summary of statistics of both period of observation are similar. It means that the selection period is good for regression.

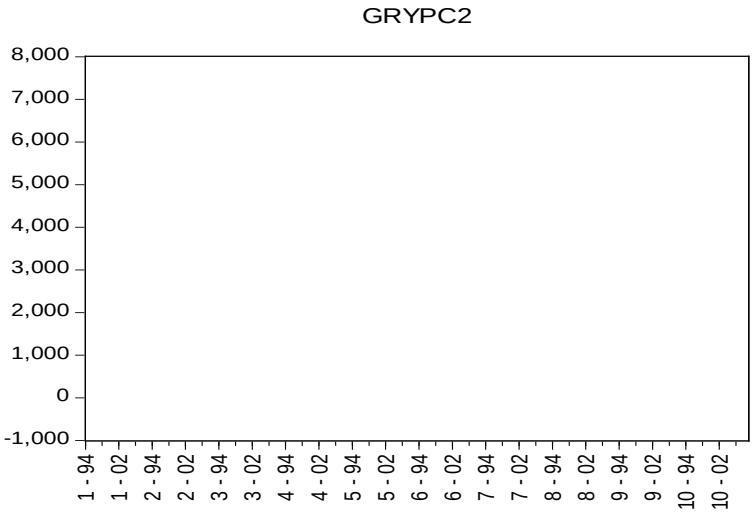
Vietnam GRYPC is described as the only countries which has the same individual cross sectional graph on both periods of time, Vietnam GRYPC is stays the same, whether it observed far from crisis or close to crisis year (see Figure 4.23 and 4.24).

Figure 4.21
GRYPC Combined Cross Section Graph (1992-2006)



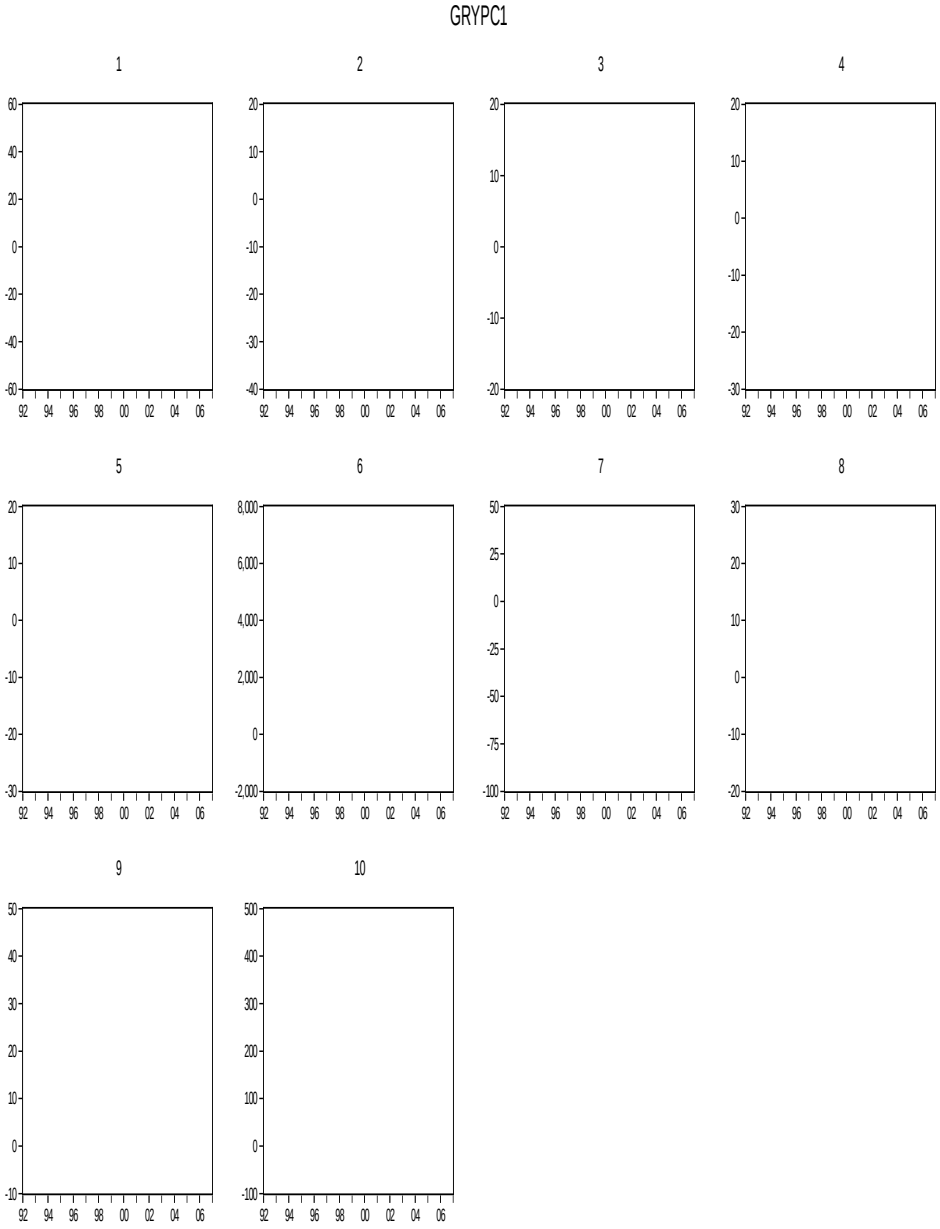
Source: Eviews-6, 2010.

Figure 4.22
GRYPC Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.

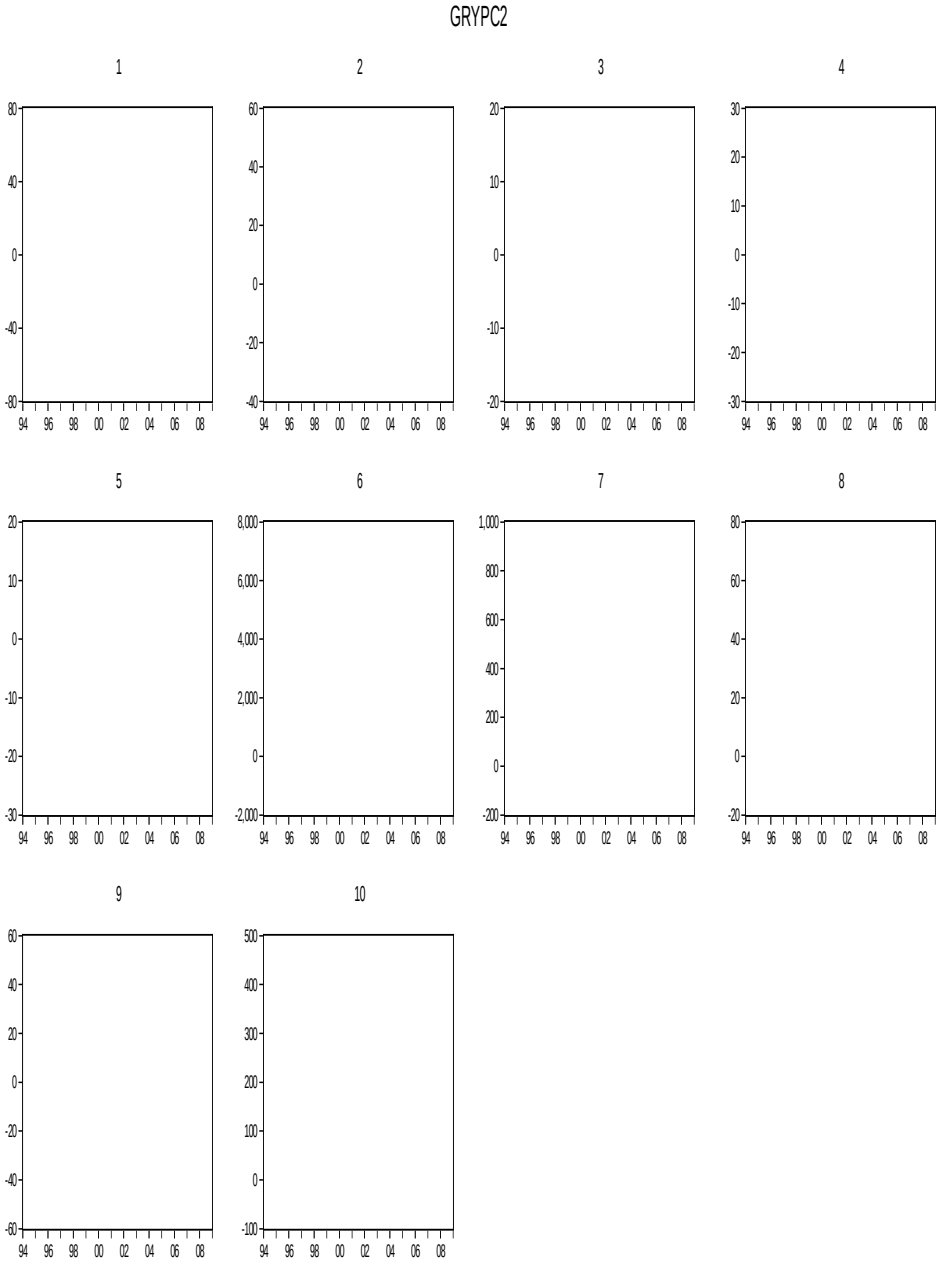
Figure 4.23
GRYPC Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

Figure 4.24
GRYPC Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

1. Indonesia
2. Malaysia
3. Singapore
4. Thailand
5. Philippines
6. Laos
7. Brunei Darussalam
8. Cambodia
9. Myanmar
10. Vietnam

4.2.2 Panel Data Analysis

This research used Panel data. Panel data is a group of individuals object, company and etc, in a current period of time of specific unit. Panel data is a combination of *cross section data* and *time series data.* As we know that this model is focuses on the regression analysis and the combination of time series and cross section, which is famous called by pooled time series. There are other names for panel data, such as pooled data (pooling of time series and cross-sectional observations), combination of time series and cross-section data, micropanel data, longitudinal data (a study over time of a variable or group of subjects), event history analysis (e.g., studying the movement over time of subjects through successive states and conditions) (Gujarati, 2003).

From three panel data method approaches, there are two approaches that are commonly used to estimate the regression model in pooled data, they are fixed effect model and random effect model. To determine the method between pooled least square and fixed effect we can test it through F test and Hausman test will be used to determine between random effect and fixed effect (Winarno, 2009).

Haussman test is used to determine between *fixed effect* method and *random effect* method. *Chi Square* value equation of Hausman test, are:

Matrix b_diff = b_fixed – b_random

Matrix var_diff = cov_fixed – cov_random

Matrix qform = @transpose(b_diff)*@inverse(var_diff)*b_diff

Null Hypothesis of Haussman test, are:

H_0 = *random effect*

H_1 = *fixed effect*

If *Chi Square* $_{statistic}$ > *Chi Square* $_{table}$ or in other word, *p*-value > 0.005, where it means that we should reject null hypothesis H_0 and determine that *fixed effect* model is the suitable model to use (Winarno, 2009). Hausman test is also available through *Eviews-6 command program.*

Table 4.1
Hausman Test Result

Test Summary	Chi-Sq. Statistic	*p*-value	Effect
CPI	7.300554	0.0069	Fixed
RER	2.667002	0.1024	Fixed
GFER	4.548718	0.0329	Fixed
GRVT	0.855584	0.3550	Fixed
GRRVT	0.857151	0.3545	Fixed
GRYPC	0.840744	0.3592	Fixed

Source: Eviews-6, 2010.
Note: fixed effect while *p*-value > 0,005

4.2.3 Classic Assumption Test Analysis

a. Normality Test

Normality test is done by examining Jarque-Bera value through X^2 table. From regression through Eviews 6.0 we find that J-B statistics as shown in Table 4.2, where it is described that CPI, RER, GFER, GRVT, GRRVT, and GRYPC, has a normal distribution, where are shown from their μ residual value.

Table 4.2
Normality Test Result

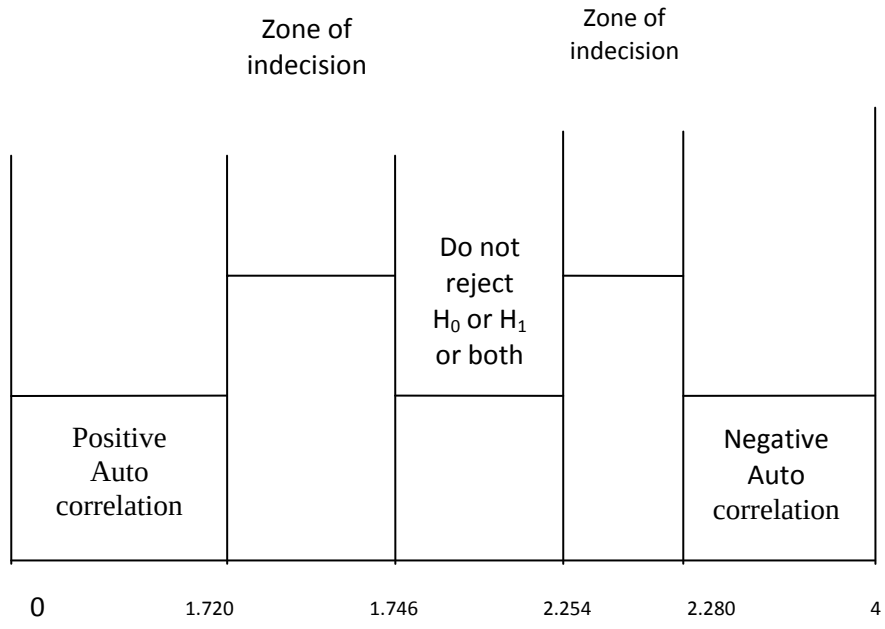
Test Summary	Df	X^2-table	Jarque-Bera	Result
CPI	9.139	23.5893	4.0928	Normal Distribution
RER	9.139	23.5893	1.1423	Normal Distribution
GFER	9.139	23.5893	0.1963	Normal Distribution
GRVT	9.139	23.5893	10.0599	Normal Distribution
GRRVT	9.139	23.5893	15.2685	Normal Distribution
GRYPC	9.139	23.5893	10.6329	Normal Distribution

Source: Eviews-6, 2010.
Note: Jarque-Bera (JB) test method is measuring value of skewness and kurtosis where if JB < X^2 Chi-square value table, it means that residual value distribution is normal (Gujarati, 2003).

b. Autocorrelation Test

One of formal test to detect autocorrelation is Durbin-Watson. This test is based on error model shown below;

Figure 4.25
Durbin-Watson Test



Note:
H0: No positive autocorrelation
H1: No negative autocorrelation

Based on Durbin-Watson, this study found that in this research the equations are generally high potential to be free from autocorrelation, as it is described on Table 4.3.

Table 4.3
Durbin-Watson Test Result

Test Summary	K	dL	Du	Dw	R^2	Dw/R^2	Result
CPI	1	1.720	1.746	1.744521	0.824031	2.117	Negative Autocorrelation
RER	1	1.720	1.746	1.820670	0.932277	1.953	Negative Autocorrelation
GFER	1	1.720	1.746	2.280812	0.228518	9.981	Negative Autocorrelation
GRVT	1	1.720	1.746	2.279058	0.227245	10.029	Negative Autocorrelation
GRRVT	1	1.720	1.746	2.137546	0.153866	13.892	Negative Autocorrelation
GRYPC	1	1.720	1.746	2.266261	0.058549	38.707	Negative Autocorrelation

Source: Eviews-6, 2010.

c. Heteroscedasticity Test

Heteroscedasticity test purpose is to know whether all the disturbance term are similar variants or not (Gujarati, 2003). This research study used White's Heteroscedasticity-Consistent Variances and Standard Errors. White has shown that this estimate can be performed so that there is asymptotically valid (i.e., large-sample) statistically inference can be made about true parameter values. As the preceding result show, (White's) heteroscedasticity-corrected standard errors are considerably larger than the OLS standard errors and therefore the estimated t values are much smaller than those obtained by OLS. On the basis of the latter, both the regressors are statistically significant at the 5 percent level, whereas on the basis of White's estimators they are not. However, it should be pointed out that White's heteroscedasticity-corrected standard errors can be larger or smaller than the uncorrected standard errors (Gujarati, 2003).

Table 4.4
Heteroscedasticity Test Result

Test Summary	Probability	Result
CPI	0.000000	Heteroscedasticity free
RER	0.000000	Heteroscedasticity free
GFER	0.000229	Heteroscedasticity free
GRVT	0.000060	Heteroscedasticity free
GRRVT	0.000146	Heteroscedasticity free
GRYPC	0.000000	Heteroscedasticity free

Source: Eviews-6, 2010.

Through Eviews-6, this research study examined the heteroscedasticity by Eviews-6 Equation Estimation command of White heteroscedasticity-consistent standard errors and covariance, where the result is injured by heteroscedasticity if the probability is significant, in the other side, the result is free from heteroscedasticity if the probability > 0.005. The heteroscedasticity test summary result that described in Table 4.4.

d. Multicollinearity Test

Multicollinearity is a condition that describes a linear relationship across independent variables. Multicollinearity happens when there are more than one independent variables in the research study. Whether this research study independent variable is only one, because of that reason this research study econometric is free from multicollinearity.

4.2.4 Regression Statistic Test Analysis (Hypothesis Test)

a. Jointly Regression Coefficient Test (F-test)

F-test goal is to determine the significance of independent variable groups in influencing the dependent variable. In this research we use 95% degree of freedom (α = 5%). The conclusion of jointly regression coefficient test is described in Table 4.5. It means that independent

variable groups influence the dependent variable. It is significant (H_0 is rejected and H_1 is accepted).

Table 4.5
Jointly Regression Coefficient Test (F test)

Test Summary	Prob (F - statistic)	Result
CPI	0.000000	Significant
RER	0.000000	Significant
GFER	0.000229	Significant
GRVT	0.000060	Significant
GRRVT	0.000146	Significant
GRYPC	0.000000	Significant

Source: Eviews-6, 2010.

b. Individuality Coefficient Regression Test (t-Test)

Individuality coefficient test regression (t-test) can be seen through t-statistic which is described in Table 4.6. The t test purpose is to see if independent variable significantly influences the dependent variable. Parameter of a variable is called as significantly influencing if probability of t statistic < 0.005.

Table 4.6
Individuality Coefficient Regression Test (t-Test)

Test Summary	t-statistic	p-value	Result
CPI	-3.5055	0.0006	Significant
RER	3.5706	0.0005	Significant
GFER	-4.7144	0.0000	Significant
GRVT	-7.1286	0.0000	Significant
GRRVT	-3.5742	0.0005	Significant
GRYPC	-25.1346	0.0000	Significant

Source: Eviews-6, 2010.

c. Determination Coefficient Test of R^2

R^2 test goal is to show whether independent variables are good to explain the dependent variable. R^2 values are 0-1 ($0 < R^2 < 1$). If R^2 value

is 1, the independent variable perfectly explains the dependent variable. Otherwise, if R^2 value is 0 if that the independent variable is not strong enough to explain the dependent variable. This determination coefficient test of R^2 is described in Table 4.7.

Table 4.7
Determination Coefficient Test of R^2

Test Summary	R^2	Result
CPI	0.89	89% Explained the dependent variable , 11% explained by others
RER	0.78	78% Explained the dependent variable, 22% explained by others
GFER	0.21	21% Explained the dependent variable, 79% explained by others
GRVT	0.23	23% Explained the dependent variable, 77% explained by others
GRRVT	0.15	15% Explained the dependent variable, 85% explained by others
GRYPC	0.40	40% Explained the dependent variable, 60% explained by others

Source: Eviews-6, 2010.

4.3 Result Interpretation

This interpretation of this study follows Chowdhury, 2004 (excerpt from Rasheed and Ahmad, 2007) where the sigma convergence model is given as;

$$\sigma_j = \alpha + \beta_j t + \varepsilon_j \quad \ldots\ldots\ldots\

if the regression result is any other value of β coefficient it implies non-convergence.

In Table 4.8, we found out that there are contradicting conditions for CPI, although all the β coefficient of CPI are negative, that means convergence Chowdhury, 2004 (excerpt from Rasheed and Ahmad, 2007), but only in one sample it is statistically significant (p-value < 0.005), this condition showed that inflation has remained unstable due to the unsteady because ASEAN during this period injured by hard crisis of 1997 which is thus not paving the way for price stability, but synchronized movements do demonstrate a possible success of a common currency in the ASEAN region. This condition is almost similar condition to research study of 'The Convergence and The SAARC Common Currency' written by Rasheed and Ahmed (2007).

Table 4.8
Panel EGLS (Cross – Section SUR)
CPI on Time

Observation Period	**1992-2006**	**1995-2009**
	1995-2009	**1992-2006**
Coefficient β	-0.0744	-0.0487
***p*-value**	0.0006	0.3041
R^2	0.82	0.89

Source: Eviews-6, 2010.

Table 4.9
Panel EGLS (Cross – Section SUR)
RER on Time

Observation Period	**1992-2006**	**1995-2009**
	1995-2009	**1992-2006**
Coefficient β	-0.0351	-0.0168
***p*-value**	0.3472	0.8464
R^2	0.96	0.93

Source: Eviews-6, 2010.

This research study time period consists of two historical crises. The first crisis happened in 1997 which is often called as East Asian Crisis. Thailand was

one of ASEAN member countries, where was injured by this crisis. Then, this crisis also gave a bad impact to others ASEAN countries, as: Indonesia, Malaysia, Singapore, Philippines, Vietnam, Laos, Myanmar, Cambodia, Brunei Darussalam. The second crisis is called Global crisis that happened in U.S (United Stated of America), which gave impact to the whole world. The negative impact happened to the whole world on real exchange rate (RER) which was shown by the p-value that not significant in whole period of time in this research study, this condition is described in Table 4.9. The table shows that, ASEAN exchange rate is fragile while it was hit by hard crises. This condition is a proof that ASEAN countries are not suitable with floating exchange rate system. Which depends on U.S dollar. As we know U.S dollar is not backed by gold anymore after the Bretton Woods agreement was breakdown in 1970. Table 4.9 also shows that RER in whole period of time in this research study which consists both historical crises, are Convergence. The β coefficients of the RER are negative. This means that RER does reflect a case of a monetary union in ASEAN region.

Table 4.10
Panel EGLS (Cross – Section SUR)
GFER on Time

Observation Period	**1992-2006** **1995-2009**	**1995-2009** **1992-2006**
Coefficient β	-0.0608	-0.2623
***p*-value**	0.0000	0.0000
R^2	0.22	0.20

Source: Eviews-6, 2010.

Table 4.10 shows that all the estimated coefficients are found to be statistically significant. This table also describes that all of the β coefficients are negative. It means that the growth rate of foreign exchange reserves is

Convergence. This indicates that there is a harmonized GFER through ASEAN countries member. This condition will help establish a currency union in ASEAN region.

Table 4.11
Panel EGLS (Cross – Section SUR)
GRVT on Time

Observation Period	1992-2006	1995-2009
	1995-2009	1992-2006
Coefficient β	-0.1629	-0.0769
p-value	0.0000	0.0000
R^2	0.23	0.23

Source: Eviews-6, 2010.

From Table 4.11, it is apparent that all the time periods in this research study estimated β coefficient for the growth rate volume of trade are negative and statistically significant. The growth in trade volume (GRVT), therefore, thus seems to be synchronizing and presenting a case of a successful formation of a common currency.

Table 4.12
Panel EGLS (Cross – Section SUR)
GRRVT on Time

Observation Period	1992-2006	1995-2009
	1995-2009	1992-2006
Coefficient β	-0.2298	-0.1202
p-value	0.0005	0.0007
R^2	0.21	0.15

Source: Eviews-6, 2010.

Presenting the case of the growth rate of relative trade volume in Table 4.12, we find significant and negative β coefficient values for the whole periods in this research study observations. This observation further of GRRVT strengthens the possibility of a single currency case.

Table 4.13
Panel EGLS (Cross – Section SUR)
GRYPC on Time

Observation Period	**1992-2006**	**1995-2009**
	1995-2009	**1992-2006**
Coefficient β	-0.0592	-0.0948
***p*-value**	0.0000	0.0000
R^2	0.06	0.40

Source: Eviews-6, 2010.

Finally, for the growth rate of per capita real GDP we have to use annual data of 1992-2006 and 1995-2009 where the observation is larger than other variables in this research. This research can observe a whole condition in the whole the growth rate of per capita real GDP 1992-2009 periods of time completely. The results of β coefficient value are presented in Table 4.13 where the β value was found negative for all equation coefficients. Although there is only one that significant, where is described that there is a big hard impact due to 1997 crisis to the growth rate of per-capita real GDP at that time period but, thus still showing a high likelihood of forming a successful single currency through the convergence result of all the GRYPC in the whole period of time in this research study.

Finally this research found, where this research has been differentiate the method of the study from the previous study of Chaudhury (2009), because this research found out from EMU study by Keenan (2002) research that written by Keenan that conclude the weaknesses of OCA, and now there are no reasons for this research to follow the previous study of Chaudhury (2009) that used OCA, and latter we finally decided that better use Convergence criterion with their

whole advantages and benefits. The important analysis result σ convergence model in this research are: if the result of regression shows a negative value of β coefficient, it indicates the possibility of convergence, while, if the regression result is any other value of β coefficient it implies non-convergence (Chowudhury, 2004) in Rasheed and Ahmad (2007).

We found out that there are contradicting conditions for CPI in this research, although all the β coefficient of CPI are negative, but only in one sample it is statistically significant (p-value < 0.005). This condition is almost similar condition to research study of 'The Convergence and The SAARC Common Currency' written by Rasheed and Ahmed (2007).

RER in whole period of time in this research study which consists both historical crises, are Convergence. The β coefficients of the RER are negative. This means that RER does reflect a case of a monetary union in ASEAN region. The growth rate of foreign exchange reserves is Convergence. This indicates that there is a harmonized GFER through ASEAN countries member. This condition will help establish a currency union in ASEAN region. The GRVT thus seems to be synchronizing and presenting a case of a successful formation of a common currency. The further observation of GRRVT strengthens the possibility of a single currency case, where the result are significant and negative β coefficient values for the whole periods in this research study of GRRVT observations. Although there is only one that significant, where is described that there is a big hard impact due to 1997 crisis to the growth rate of per-capita real GDP at that time period but, thus still showing a high likelihood of forming a

successful single currency through the convergence result of all the GRYPC in the whole period of time in this research study.

The result of this study described that the first previous study of Kazushi, Shimizu, (2001) where it suggest that monetary integration should be studied after deepening market integration by the development of AFTA, it was true. And also it was support by the second previous study of Madhur, Srinivasa, (2002) where it viewed from this perspective, that the launching of the AFTA and the regional resources sharing arrangements under the Chiang Mai Initiative may perhaps posses the potential to gradually lead to greater regional monetary cooperation.

The result of this study answered the third previous study that was written by Bunyaratavej, Kraiwinee, (2003), where the research of them described that the ASEAN region as a whole may not be an ideal candidates for forming a currency union, as GDP per capita displays a high degree of heterogeneity, by the fact that it might be happen to ASEAN-6 as their research focus, although the forth previous study that written by Ramayandi, Arief, (2005), result The five largest ASEAN countries seem to be suitable candidates to begin with. In the other side while the research focus apply in the full integration of ASEAN-10, the answered sound be different, where through the convergence of this study result, it totally proved that there are likely to be considerable benefits while apply monetary union of common currency area after full integration of ASEAN-10 takes place, as support by the fifth previous study that was written by Thangavelu, Shandre M. (2008), and the sixth previous study that was written by Chaudhury, Rafi, (2009).

CHAPTER IV

FINDINGS AND ANALYSIS

4.4 Description of Research Objects

ASEAN is a regional organization in South East Asia. It was established in 1967 under the Bangkok Declaration, with five original member countries: Thailand, Malaysia, Singapore, the Philippines and Indonesia. Latter it is called ASEAN 5. Brunei Darussalam joined in ASEAN in 1984. ASEAN then is called ASEAN 6, with relatively developed economies in Southeast Asia. Now ASEAN has ten member countries with Vietnam joining in 1995, Laos and Myanmar in 1997 and Cambodia in April 1999. The latest 4 members are called ASEAN 4, or CLMV. The whole ASEAN member countries are called ASEAN 10, and if Vietnam and Laos are not included, it is called ASEAN 8. Nowadays, the ASEAN region has a population of about 500 million, a total area of 4.5million square kilometers, a combined gross domestic product (GDP) of US$737 billion, and a total trade of US$720 billion. ASEAN FTA (AFTA) is the earliest FTA in Asia, which was initiated in 1992 (Yi, 2005).

Different from the two major regional integrations respectively in Europe and the North Americas, EU faced internal pressure politically in Europe internal security issue, namely to restrain Germany, and external pressure politically from former Soviet Union, and Economically from the U.S. , ASEAN creation was not necessarily logical. If one considers the circumstances of the five original countries, each of which was widely diverse, and all of which were linked to

external powers, mainly through former colonial channels. It is doubtful whether a clear identity as ASEAN or Southeast Asia, for that matter existed at the beginning. This was because that almost every original ASEAN member nation had recently gained independence from external powers, and had the extremely strong desire to be independent both in politics and economy. One may imagine, therefore, that ASEAN was a creation of the Cold War, supported by the U.S. strategy for a political and economic formation at the regional level. Consequently, it is not surprising that ASEAN had only limited success during its early era. Although the member countries of ASEAN are geographically close, the interdependence in economy among ASEAN was minimal. Almost every ASEAN member nation adopted the import substitution model which is based on a closed economy. In addition, ASEAN was not established for economic purpose, so in the establishment stage, economic integration among ASEAN almost did not exist. Estimates during the establishment stage showed that the share of intra-ASEAN trade of the total trade of the member countries was between 12 and 15 percent. In summary, during the establishment stage of ASEAN, ASEAN was dominated by ideology, mainly for the purpose of political solidarity against communism rather than for the purpose of economic integration, although from neither aspects could the integrations be considered successful. Although the member countries of ASEAN are geographically close, the interdependence in economy among ASEAN was minimal. Almost every ASEAN member nation adopted the import substitution model which is based on a closed economy. In addition, ASEAN was not established for economic purpose, so in

the establishment stage, economic integration among ASEAN almost did not exist. Estimates during the establishment stage showed that the share of intra-ASEAN trade of the total trade of the member countries was between 12 and 15 percent. In summary, during the establishment stage of ASEAN, ASEAN was dominated by ideology, mainly for the purpose of political solidarity against communism rather than for the purpose of economic integration, although from neither aspects could the integrations be considered successful (Yi, 2005).

After the end of the Vietnam War in 1975, with the retreat of U.S. power in southeastern Asia, the antagonism in ideology became less strong. The ASEAN member nations turned more to regional security concerns and domestic stability. Border disputes had long existed among ASEAN countries: Malaysia and Indonesia over two islands, Malaysia and Singapore over an island, Indonesia and the Philippines over some islands, the Philippines, Vietnam and China over some islands in the South China Sea. A domestic instability had also long existed in most of the member nations. There were many parties and religious factions in almost every member country. Some countries were controlled by military government, some countries cabinets were changed frequently, other countries anti-government armed forces and terrorist activities were furious. This led to the first heads of government's meeting held in Bali in 1976 and the conclusion of the Treaty of Amity and Cooperation in Southeast Asia (TAC). The TAC is an important non-aggression political pact of ASEAN. It declared the following fundamental principles:

- Mutual respect for the independence, sovereignty, equality, territorial integrity, and national identity of all nations;
- The right of every State to lead its national existence free from external interference, subversion or coercion;
- Non-interference in the internal affairs of one another;
- Settlement of differences or disputes by peaceful manner;
- Renunciation of the threat or use of force; and
- Effective cooperation among themselves.

The TAC showed that domestic affairs should be free from external interference and that mutual disputes should be settled free from the force and threat. This demonstrated that the TAC was a political accord of landmark meaning, because it displayed the strong determination to be free from external powers interference, and to be respected and independent, dealing with the internal affairs among ASEAN through equal dialogue and peaceful means. This established a good political basis for southeastern regional security. Due to the TAC, ASEAN s regional security improved and the Regional security conditions could usually build confidence in promoting regional economic integration. In 1977, immediately after the conclusion of the TAC, the ASEAN member countries signed the Preferential Trading Arrangement (PTA) of 1977, which accorded tariff preferences for trade among ASEAN economies, aiming at enhancing the economic cooperation among ASEAN. Ten years later, an Enhanced PTA Program was adopted at the Third ASEAN Summit in Manila further increasing intra-ASEAN trade (Yi, 2005).

Substantial Integration Stage (1992-1997): from the Launching of AFTA to before the Eruption of Southeastern Asia Financial Crisis. During this period, the ASEAN member countries signed the ASEAN Declaration on the South China Sea, Manila, in July 1992. In the Declaration, Article 1 emphasizes by peaceful means, without resort to force to resolve all sovereignty and jurisdictional issues pertaining to the South China Sea; Article 3 resolves to explore the possibility of cooperation in the South China Sea relating to the security of maritime navigation and communication, protection against pollution of the marine environment, coordination of search and rescue operations, efforts towards combating piracy and armed robbery as well as collaboration in the campaign against illicit trafficking in drugs ; Article 4 advocates a code of international conduct over the South China Sea based on the principles contained in the TAC ; art. 5 invite all parties concerned to subscribe to this Declaration of principles. Article 5 is worth notice: because China is a major party in the South China Sea. The Declaration, in fact, invites China to negotiate with the party concerned South China Sea among ASEAN. In December 1995 in Bangkok, in the foreign ministers meeting, ASEAN concluded the Treaty on the Southeast Asia Nuclear Weapon-Free Zone. It was obvious that ASEAN s political integration still centered surround eliminating the regional security concerns. As the Treaty declared that the establishment of a Southeast Asia Nuclear Weapon-Free Zone will contribute towards strengthening the security of States within the Zone. In January 1992 at the Fourth ASEAN Summit in Singapore in January 1992, the Framework

Agreement on Enhancing Economic Cooperation was signed, which included the launching of a scheme toward an AFTA, aiming at the elimination of tariff and non-tariff barriers and promoting trade liberation among the member countries. In 1995, the Fifth ASEAN Summit held in Bangkok adopted the Agenda for Greater Economic Integration, which included the acceleration of the timetable for the realization of AFTA from the original 15-year timeframe to 10 years. Economic integration in this period proved greatly successful. ASEANs economies developed at a surprising speed. Within the three years from the launching of AFTA, exports among ASEAN countries grew from US$ 43.26 billion in 1993 to almost US$ 80 billion in 1996, an average yearly growth rate of 28.3 percent 26. In the process, the share of intra-regional trade from ASEANs total trade rose from 20 percent to almost 25 percent. Tourists from ASEAN countries themselves have been representing an increasingly important share of tourism in the region. In 1996, of the 28.6 million tourist arrivals in ASEAN, 11.2 million or almost 40% came from within ASEAN itself. During this period, ASEANs economic development obtained a strong reputation. It was called the miracle of Southeast Asia in the world. Correspondingly, ASEANs political status rose too (Yi, 2005).

Break of ASEAN Regional Economic Integration by the Southeast Asia Financial Crisis In February 1997, the Southeast Asia financial crisis (the financial crisis) erupted. The ASEAN economies were hit hard and suffered great losses, and at the same time the crisis had tremendous impacts on other Asian countries and regions and later on developed countries, including the U.S., Japan and Europe. The total economic loss of South Korea, Thailand, Malaysia and

Indonesia approximated US$ 600 billion, the GDP per Capita in US$ of these countries decreased to the level of ten years ago. During only a few months, the currency in these countries was devalued by 50 percent, or even 80 percent. The financial crisis fully exposed the long-established weakness of ASEAN s regional economy. They are:

5) Heavy Economic Dependence on the U.S. and Japan

   First, ASEAN member countries long and excessively depended on foreign capital, especially U.S. and Japanese capital, and the efficiency to make good use of the foreign loans was not high. So if the international balance of the ASEAN countries was a deficit, then the national currency should have devalued in terms of its real value. However, the national currency of most ASEAN s countries was pegged to U.S. dollar one way or another. Thus, when international balance of payments kept a deficit for a long time, the exchange rate of national currency with US dollar could not be maintained. The financial crisis erupted. Second, the previous rapid growth of ASEANs economy had been based on the export-processing model. In the 1970s and the 1980s, member countries processed downstream electronics products for Japan; when ASEAN went into the 1990s, the Japanese economy began to decline and the U.S. economy began to rise, ASEANs export became dependent on the U.S. market. Once the demand of the two markets was insufficient, the ASEANs economy would be affected seriously.

6) Excessively Open Capital Market

The capital market in ASEAN country was excessively open. One World Bank study placed Malaysian and Thai trade policies as among the most open in developing economies. Opening domestic markets to outside money (under an early round of pressure from the IMF [the International Monetary Fund) brought a deluge of short term foreign investment and spurred heavy short-term borrowing from abroad, fueling a building boom. Take Thailand for example, by the mid 90s, a speculative binge in everything from high-rise office towers to condos to gold courses accounted for nearly 40% of growth in Thailand. 34 When the real estate bubble burst, conditioning the rather open capital market, too much capital rushed out, too quickly. The excessive inflow of capital reversed itself and fled with little regard for the actual strength of a particular economy.

7) Weak Intra-Regional Economic Interdependence

The economic interdependence among the member countries was weak. The intra regional trade among ASEAN accounted for a small portion of the total trade of ASEAN, about no more than 25 percent, far less than the level of 40% plus of intra-regional trade among EU and NAFTA; moreover, such small portion was mainly produced between Singapore and Malaysia,36 the intra-regional trade among other ASEAN s countries was even smaller. Therefore once the demand outside ASEAN sharply declined, the intra-regional demand could not be spurred to absorb part of

the products diverted from the exportation, and then the national and regional economy collapsed together.

8) Similarities in Industrial Structures Southeastern Asian export industries lay in the bottom layer of the global vertical division system, gathering a large number of labor-intensive and half capital-intensive industries. It became the weakest part in the global economy chains. ASEAN s member countries repeated the same development model: absorbed foreign capital, invested in the export-processing industries, and their products tended to be alike. Whether in their domestic economy or even in the intra-regional economy among ASEAN, the development layout of industrial hierarchies and diversities was not formed; almost none of the production chains were wholly shaped. When the global economic structures were adjusted and such adjustments caused the demand for ASEAN s exports to greatly decline, ASEAN s downstream processed products would be superfluous and ASEAN s economy would be damaged seriously. Due to the financial crisis, ASEAN s competition in exportation and attraction of foreign investment was unfavorably affected immensely. In addition, because its member countries had to engage in dealing with domestic problems caused by the financial crisis, the mutual cooperation and coordination among ASEAN were suspended. As a result, ASEAN s status and influence both in economy and politics declined rapidly either in Asia or in the world.

The financial crisis provided ASEAN with many lessons. If in the future we are in retrospect of the process of ASEAN s regional economic integration and even of

the later East Asian regional economic integration, we will discover that the financial crisis undoubtedly acted as a watershed and even a catalyze. Before the financial crisis, the rapid economic growth of ASEAN mainly depended on foreign capital and markets, based much less on intra economic interdependence among ASEAN and their domestic markets. The member countries had no strong motivations to enhance a complete integration to close their relationship in economy. The financial crisis confronted ASEAN with many new issues for discussion. First, the global IMF failed in the financial crisis. It suggested that a regional monetary and financial cooperation would be necessary. Second, unlike the developed countries, the door of the non-developed countries capital market can only open step by step, rather than too fast. Third, the simplification of monetary policy, which was only pegged to U.S. dollar, should be changed, because once the U.S. dollar s value fluctuates badly, the concerned countries monetary and financial system will suffer from great influence. Therefore the monetary policy should be diverse, for example, adopt a package of pegged moneys. Besides, the similarities of regional industrial structures and weak intra-regional economic interdependence were viewed as the in-depth causes of the financial crisis. It was considered that establishing among ASEAN the diverse and hierarchical economies, stretching the production chains, strengthening economic complementarities and enhancing the intra-regional economic interdependence will effectively form regional competitive force to resist to the external economic impacts, making ASEAN a regional trade bloc in a genuine sense. So it was a logical consequence that after the financial crisis ASEAN began the complete

intra-regional economic integration in a variety of areas to enhance the intra-regional economic interdependence (Yi, 2005).

In responding to the crisis, ASEAN heads of governments in December 1997 set out their ASEAN 'Vision 2020' statement. The vision contained a message in favor of moving towards closer cohesion and economic integration. It was soon followed by an action plan concluded in the following year at the ASEAN summit in Hanoi. The action plan among other things, calls for a strengthening of the financial system in the region to maintain regional macroeconomic and financial stability, and to intensify cooperation on money, tax and other financial related matters. Prior to East Asia crisis, economic integration in East Asia has been enhancing via the market driven forces such as cross-border trade, FDI (foreign direct investment) and finance. Over the past 20 years, international trade and FDI activities have expanded rapidly through multilateral international institutions such as World Trade Organization (WTO), Asia Pacific Economic Cooperation (APEC) as well as unilateral (or multilateral) trade liberalization processes. Nevertheless, the patterns of economic cooperation in East Asian countries have been changed, especially after the East Asia financial crisis erupted in mid-1997. The rapidly changing international environment and East Asia crisis have emerged a common interest amongst East Asia countries in creating a strong impetus for regional cooperation. This has led to the Chiang Mai Initiative (CMI) agreement on bilateral swaps and discussion of the possibility of creating a monetary union among the ASEAN+3. Indeed, there have been few attempts proposed to create cooperative frameworks that help to prevent and

manage future currency crises and to promote economic efficiency by developing sound financial systems. Japan, for example, has proposed to create an Asian Monetary Fund (AMF) in September 1997. The members of this Fund would contribute some portion of their international reserves to a central fund, which would be utilized to provide a financial assistance to countries affected by external crises such as financial and currency crises. However, the United States, China and the IMF against the establishment of the AMF proposal on two reasons: soft conditionality and duplication. As a further step in promoting Asian economic integration, Japanese finance minister Miyazawa has made a proposal that is called “New Miyazawa Initiative” in October 1998, which aimed to set up a financial assistance scheme totaling 30 billion US dollars. This Initiatives, however, has met with strong criticism because the proposal is too Japan-centered, and the attitude of Japan in regional initiatives is rather ambiguous (Moon, 2000 (excerpt from Choo and Choong, 2009)). Although this proposals were rejected, there were few more successful initiatives have been proposed towards a closer monetary cooperation in Asian. For example, a conference was held in Manila in November 1997, which consists of deputy finance ministers and central bank governors from 14 mostly Asian countries. The outcome of the conference was the establishment of Manila Framework Group (MFG), a new framework to enhance Asian Regional cooperation and to promote financial stability in the region. In addition, the ASEAN finance ministers have agreed to establish the ASEAN Surveillance Process (ASP) in October 1998 to encourage policy dialogue based on the peer review and mutual interest among ASEAN member

countries. In November 1999, China, Japan, and South Korea have been invited to join ASP, which making “ASEAN+3” reality in financial surveillance (Choo and Choong, 2009).

To reinforce the Hanoi action plan in order to achieve this goal, ASEAN nations have also moved forward by looking at a wider region in terms of economic and financial cooperation through the Chiang Mai Initiatives (CMI) that was launched in May 2000. The initiative aimed to develop a network of bilateral swap agreements (local currency to US dollar or Japanese) among Northeast Asian countries, and strengthening an intra-ASEAN swap agreement. In May 2002, bilateral swap agreements between Japan, Korea, Thailand, Malaysia, Philippines, and China have been initiated. Also the ASEAN swap agreement was extended to cover all the 10 member countries. The CMI represents the first milestone towards constructing a coordinated intervention policy and currency arrangement regionally. Nevertheless, this step is more likely to be more a case of “pooling reserve” in dealing with external instability or crises than a commitment to bilateral intervention to stabilize regional bilateral exchange rates. Obviously, financial cooperation has seen some positive progress among East Asia countries; however, incentives for monetary cooperation are still lack (Choo and Choong, 2009). Although some economic indicators are agreeable, China, Japan and Korea do not appear to be economically suitable for monetary cooperation with ASEAN (Jikang and Yin, 2005). The uncertain economic times ahead however merit discussion on how further integration could help the organization maintain economic stability while raising its regional competitive profile. This study finds

that while significant reforms can be made in the absence of such a union, there are likely to be considerable benefits that apply only after full integration of ASEAN takes place (Chaudhury, 2009).

4.5 Data Analysis

4.5.1 Raw Data Analysis

Data that are used in this research is a secondary data, which is collected in a form of literature data that are related to this research. Shape literature data that we use in this research are; note, document, and also article data. All the data that we gained latter we will manage and process it in order to match it to answer out research question and objectives. For this research purpose we require data from UNDIP (Diponegoro University) Library at Semarang City to get the International Financial Statistics of IMF 2004 and we also surfing searching data on-line through internet until finally we found Nation Master, UN data, Asian Development Bank, CIA World Fact book that help us to complete the data that we gained before from UNDIP library. Data that we have collected from International Financial Statistics of IMF 2004 and Nation Master, UN data, Asian Development Bank, CIA World Fact book are; 1) Consumer Price Index (CPI), 2) Nominal exchange rate, 3) Export, 4) Import, 5) Population, 6) Gross Domestic Product (GDP).

Methodology that used in this research consists of the EMU (European Monetary Union) model principle in launching their single currency Pitchford and Cox, 1997 (excerpt from Rasheed and Ahmed, 2007) and the sigma convergence model (Chowdhury, 2004 (excerpt from Rasheed and Ahmed, 2007). Pitchford

and Cox, 1997 (excerpt from Rasheed and Ahmed, 2007) edited the European Monetary Union (EMU) principles for launching single currency for Europe. According to the editors the indicators like real income per capita, call money rate, consumer price index, real exchange rate, exports, imports and balance of payments are vital. In our study we have included the volume of trade both for the country specific and as a world relative index. They used the following data series to apply the beta convergence criteria to evaluate the possibility of the formation of a single currency in the Asia. The list of the selected variables is as follows;

xx. Consumer Price Index (CPI)

xxi. Real Exchange Rate in US dollars (RER)

xxii. Growth rates of Foreign Exchange Reserves (GFER)

xxiii. Growth rates of Real Volume of Trade (GRVT)

xxiv. Growth rates of Real Relative Volume of Trade (GRRVT)

xxv. Growth rates of Per Capita Real GDP at factor cost (GRYPC)

Where;

GRYPC = Growth rate of (GDP/ (population))

RER = Nominal Exchange Rate *CPI_{US} / CPI

GRVT = Growth rates of {(Exports + Imports)/CPI}

GRRVT = Growth rates of {(Exports + Imports)/CPI}/

{(Exports $_W$ + Imports $_W$)/CPI_W}

Note;
W = indicating world

US = United State country

Raw data in this research is gain through several process calculations of data collection from secondary data source, as describe on above explanation, because of that reason data collecting process journey is not as simple as imagine, and here are the raw data analysis of this research study;

(13) Consumer price indices (CPI) of ASEAN-10 Analysis (1992-2009)

Consumer price indices in this research means as an inflationary indicator that measures the change in the cost of a fixed basket of products and services, including; housing, electricity, food, and transportation. Consumer price indices is also mean as an index of prices used to measure the change in the cost of basic goods and services in comparison with a fixed base period, which is also called, cost-of-living-index. In this research CPI of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2006 as CPI z and 1995-2009 as CPI w.

Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.1 and 4.2 is a combined a cross sectional graph which displays separate lines for each cross-section in a single graph. Figure 4.3 and 4.4 is individual cross sections displays separate time series graphs for each cross-

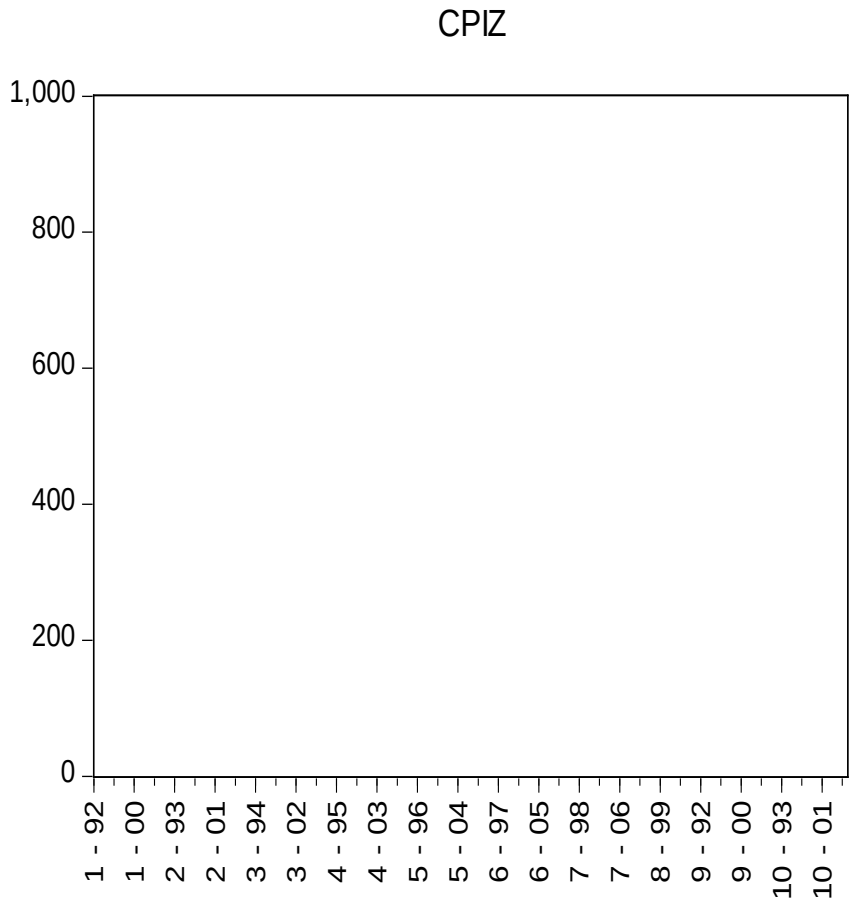
section. Combined cross section graph and individual cross sections graph are a single graph containing the summary of statistics for each period.

Figure 4.1 and 4.2 show that in general the summary of statistics of both periods of observation are similar. It means that the selection period is good for regression.

Indonesia CPI is described as the only one which has the same Individual cross sectional graph on both periods of time. Indonesia CPI shape is stays the same, whether it observed far from crisis or close to crisis year (see Figure 4.3 and 4.4).

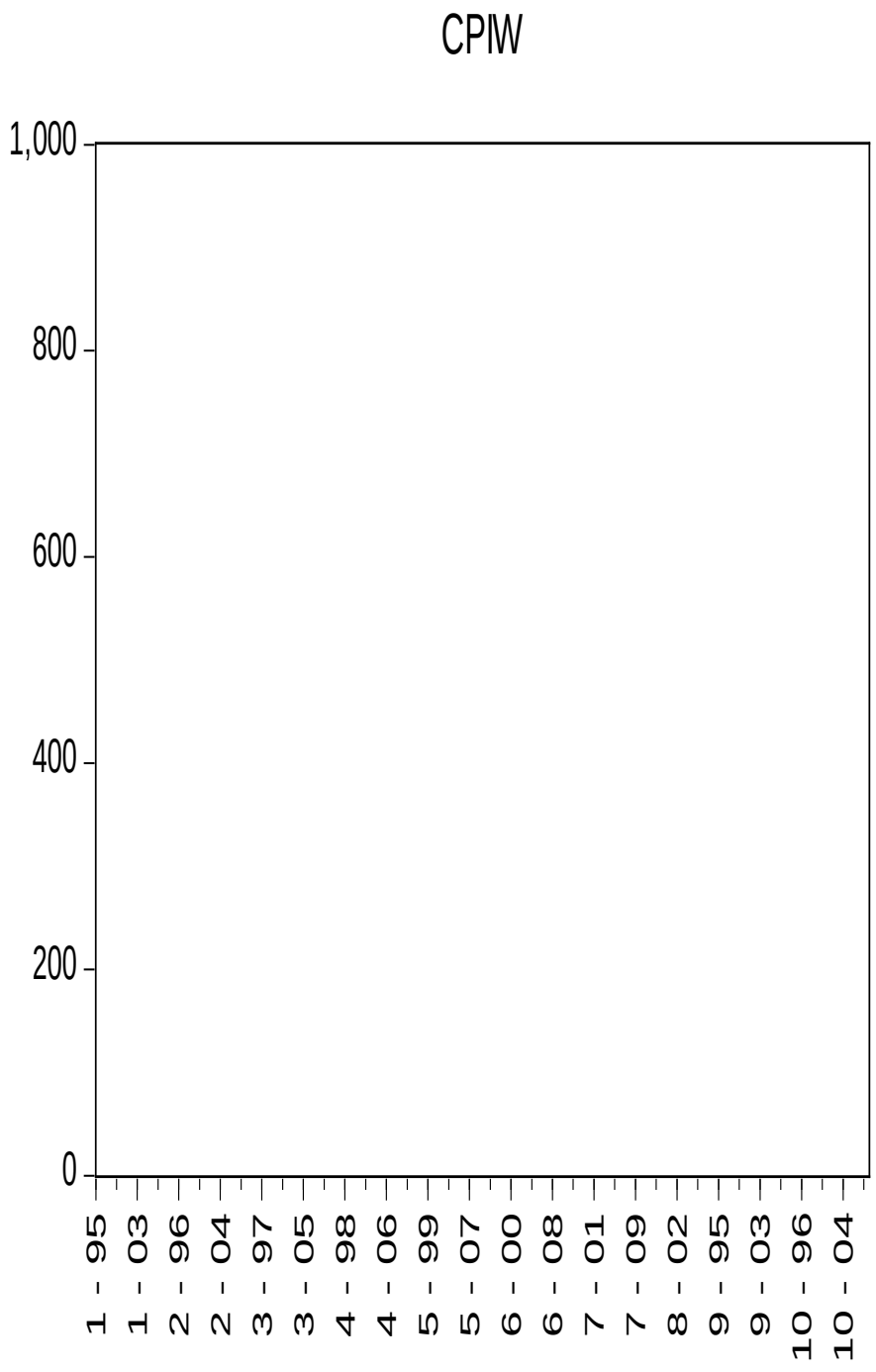
Figure 4.1

CPI Combined Cross Section Grap



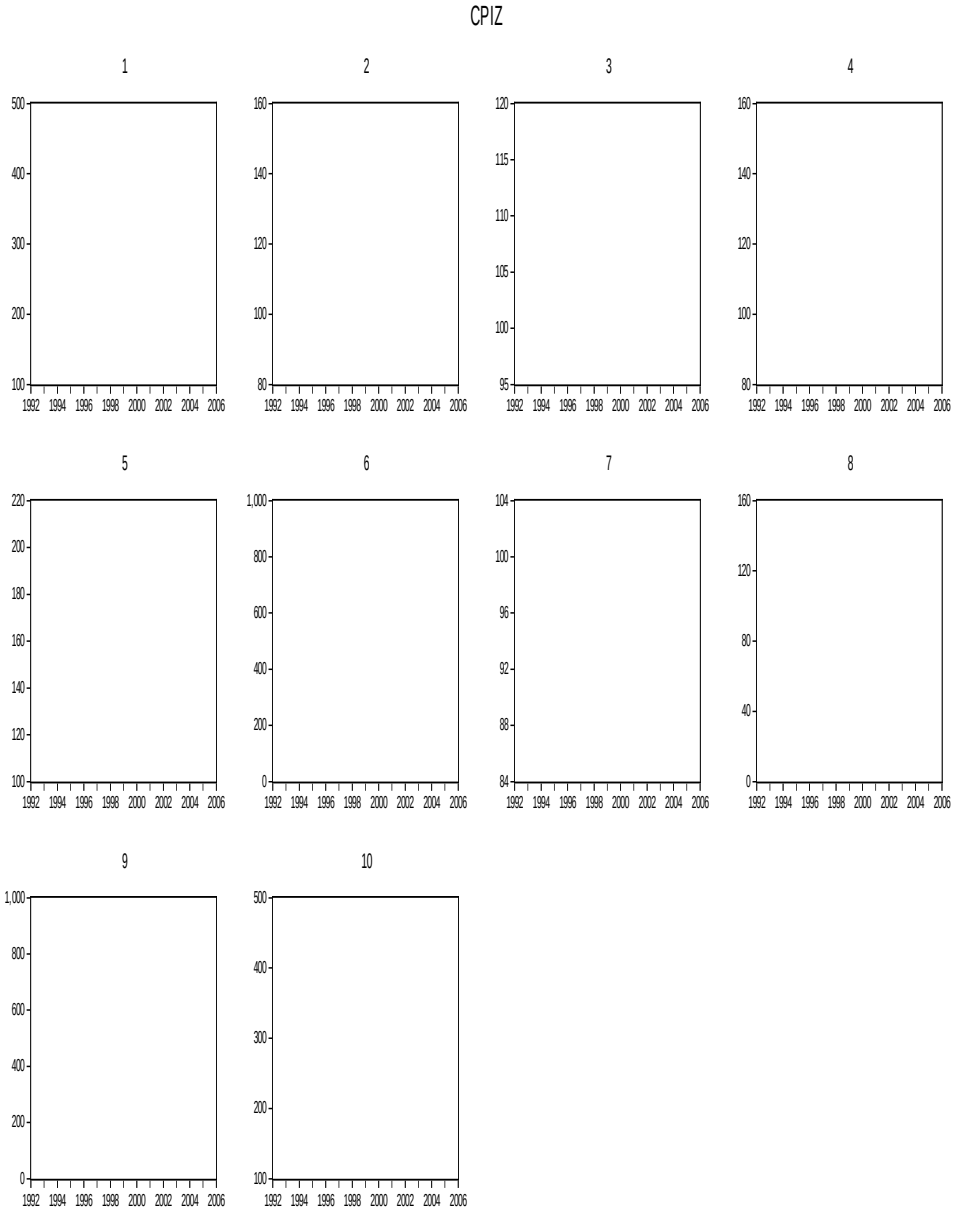
Source: Eviews-6, 2

Figure 4.2
CPI Combined Cross Section Graph (1995-2009).



Source: Eviews-6, 2010.

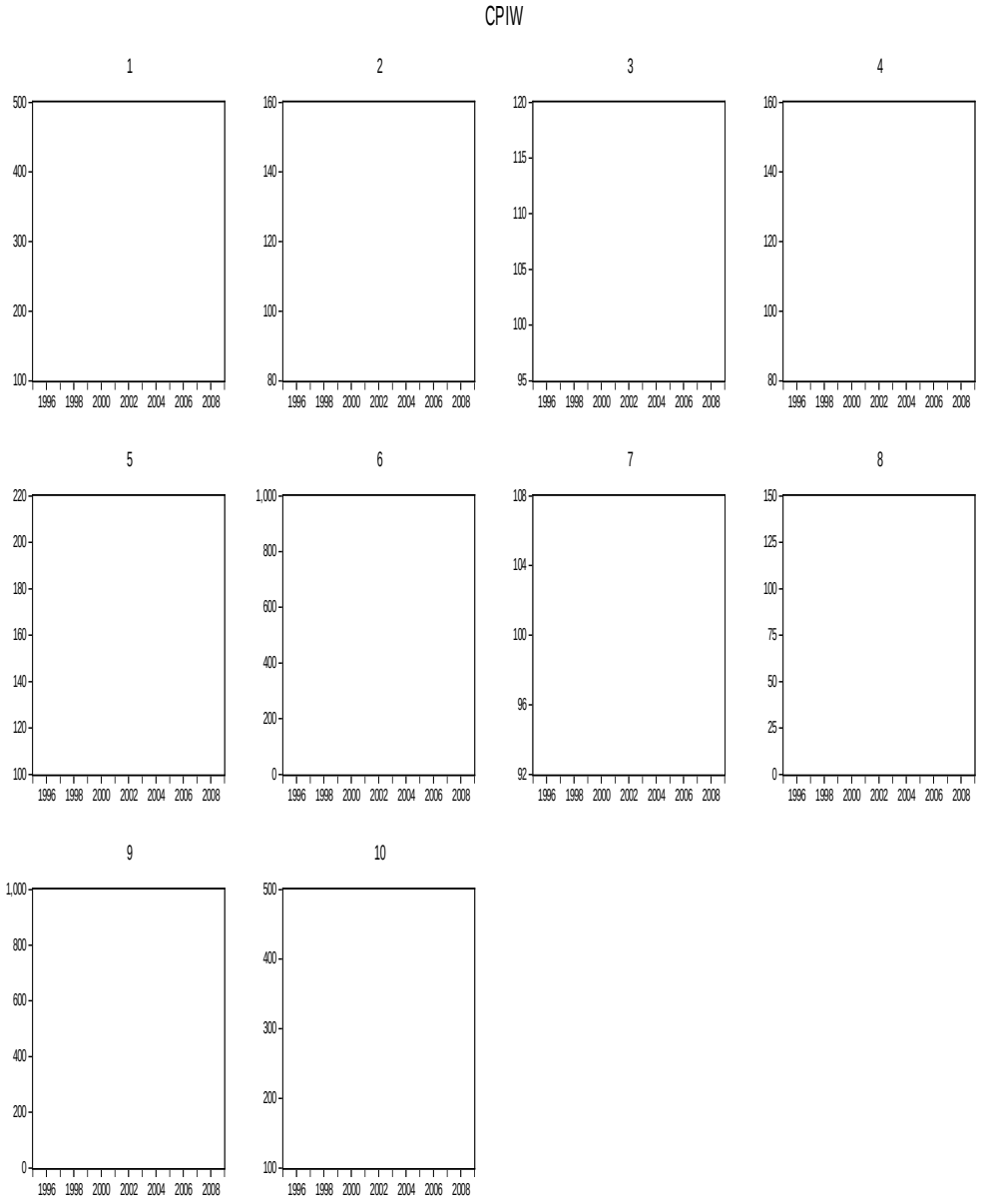
Figure 4.3
CPI Individual Cross Section Graph (1992-2006).



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

Figure 4.4
CPI Individual Cross Section Graph (1995-2009).



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

(14) Real exchange rates in US Dollar (RER) of ASEAN-10 Analysis (1992-2009)

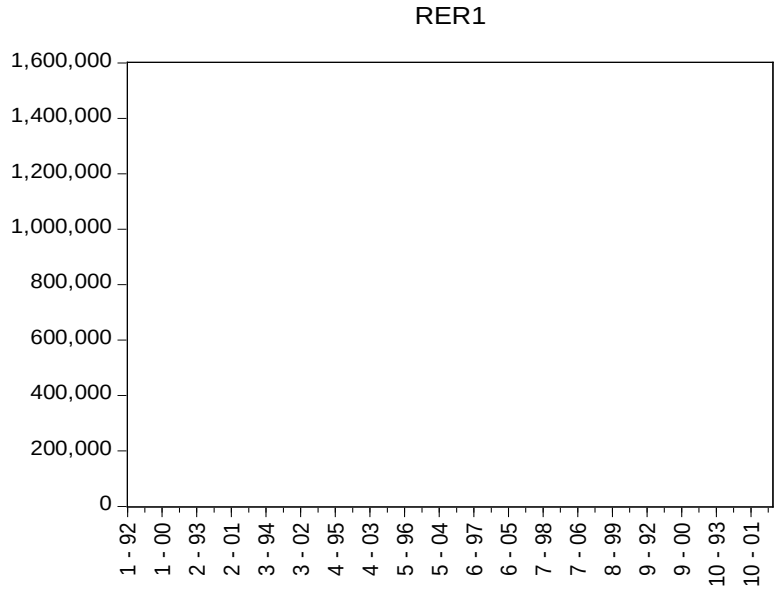
Real exchange rates in US Dollar in this research means as the price of one currency expressed in terms of U.S. Dollar which is adjusted for inflation. In this research RER of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2006 as RER 1 and 1995-2009 as RER 2.

Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.5 and 4.6 are cross sections graph which displays separate lines for each cross-section in a single graph. Figure 4.7 and 4.8 are individual cross sections, which display separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph are a single graph containing summary statistics for each period.

Figure 4.5 and 4.6 show that in general the summary statistics of both periods of observation are similar, it means that the selection period is good for regress.

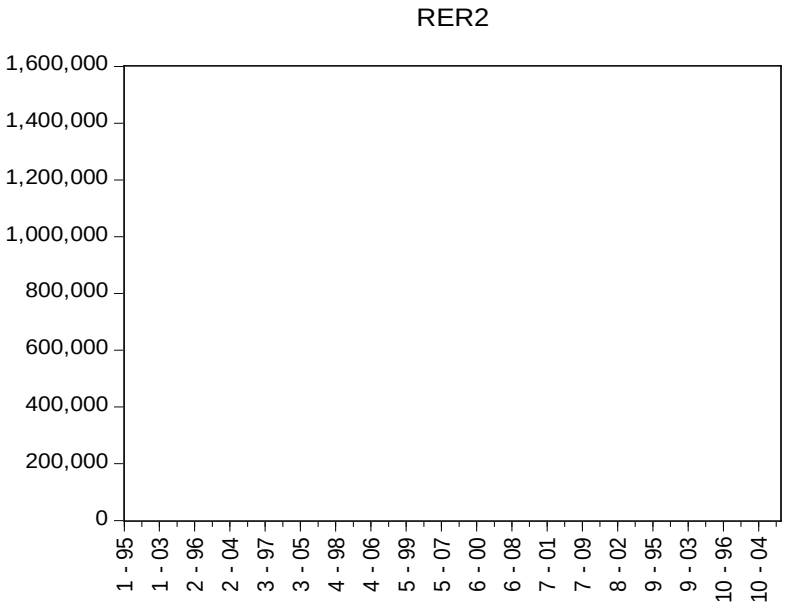
Malaysia, Singapore, and Thailand RER's are described as the only countries which have the same Individual cross section graph on both periods of time, whereas: Malaysia, Singapore, and Thailand RER's shape stay the same, whether it was far from crisis or close to crisis year (see Figure 4.7 and 4.8).

Figure 4.5
RER Combined Cross Section Graph (1992-2006).



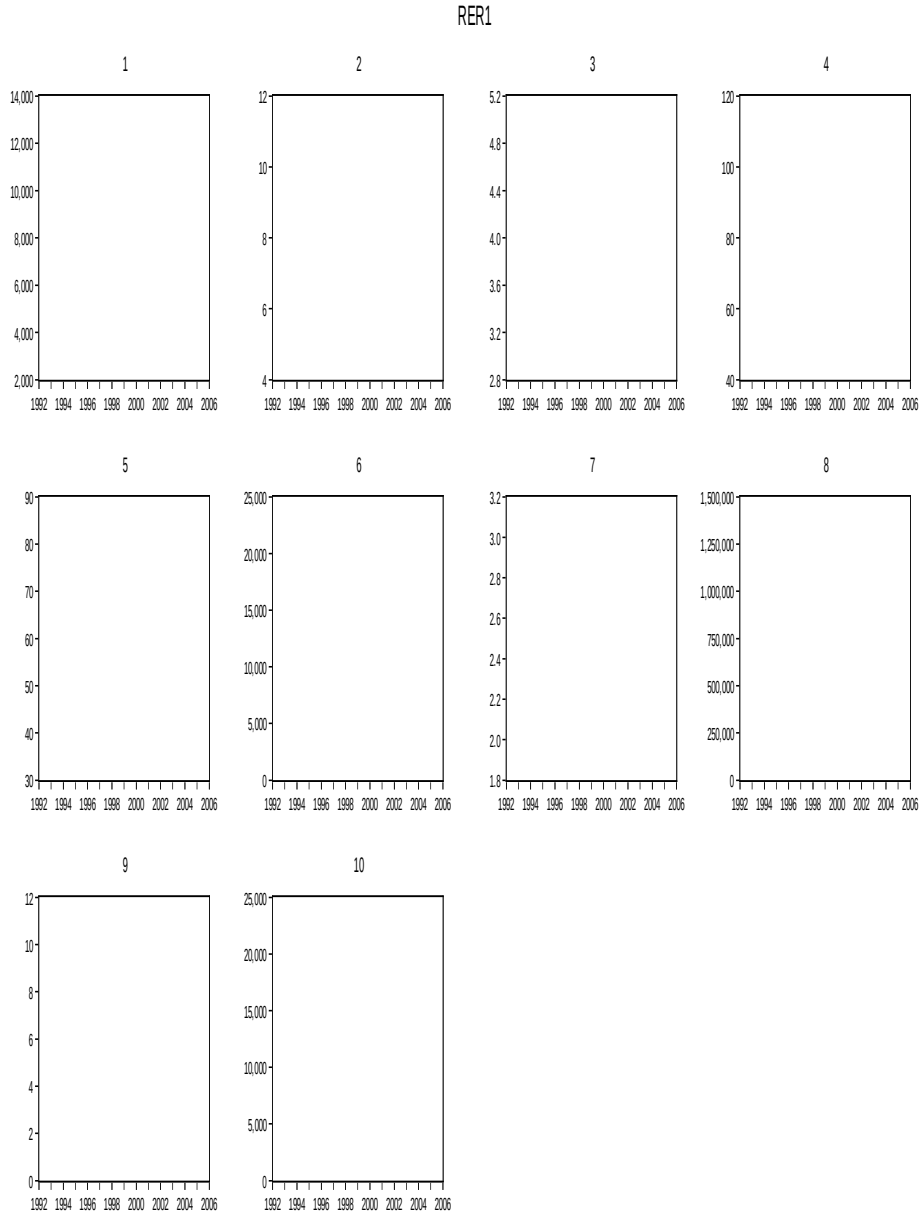
Source: Eviews-6, 2010.

Figure 4.6
RER Combined Cross Section Graph (1996-2009)



Source: Eviews-6, 2010.

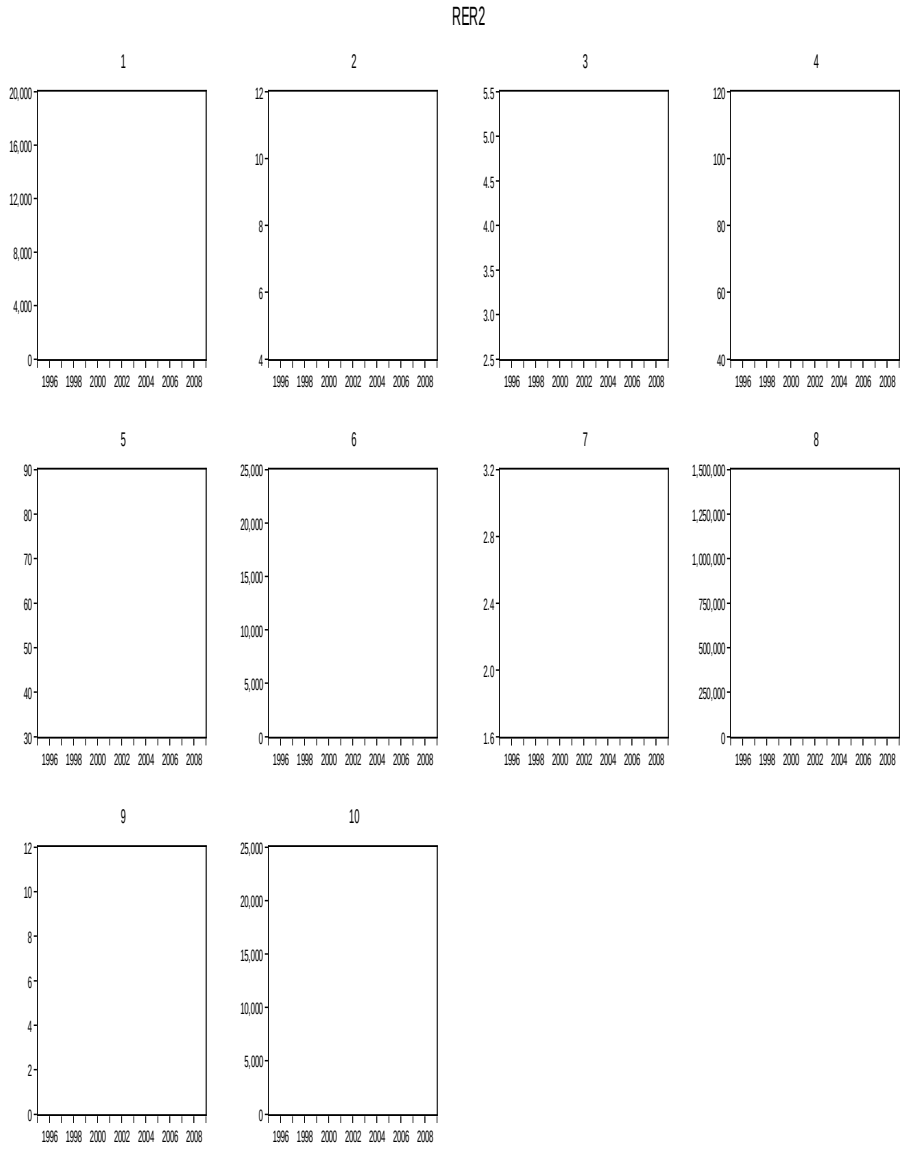
Figure 4.7
RER Individual Cross Section Graph (1992-2006).



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

Figure 4.8
RER Individual Cross Section Graph (1995-2009).



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

(15) Growth rates of foreign exchange reserves (GFER) of ASEAN-10 Analysis (1992-2009)

Growth rates of foreign exchange reserves in this research means the amount of increase a deposit of a foreign currency of other countries as assets allow government to keep their currencies stable and reduce the effect of economic shocks. In this research GFER of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data in this research study. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2006 as GFER 10A and 1993-2007 as GFER 10B.

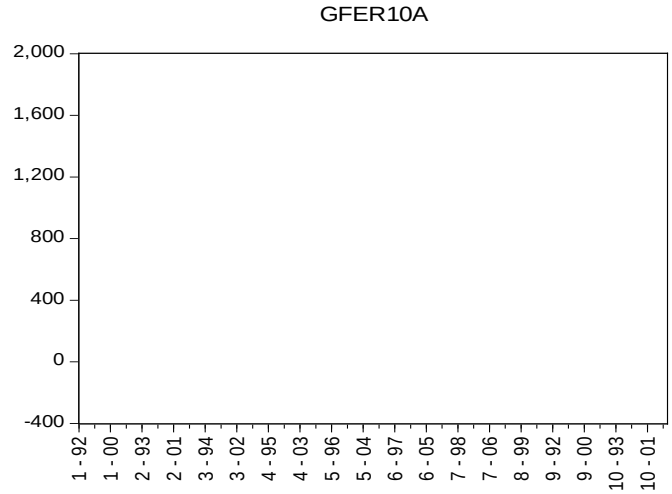
Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.9 and 4.10 is a combined cross sectional graph which displays separate lines for each cross-section in a single graph. Figure 4.11 and 4.12 are individual cross section which displays separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph a single graph containing summary statistics for each period.

Figure 4.9 and 4.10 show that in general the summary statistics of both periods of observation are similar, it means that the selection period is good for regress.

Indonesia GFER for regression is described as the only country which has the same Individual cross section graph on both periods of time, whereas

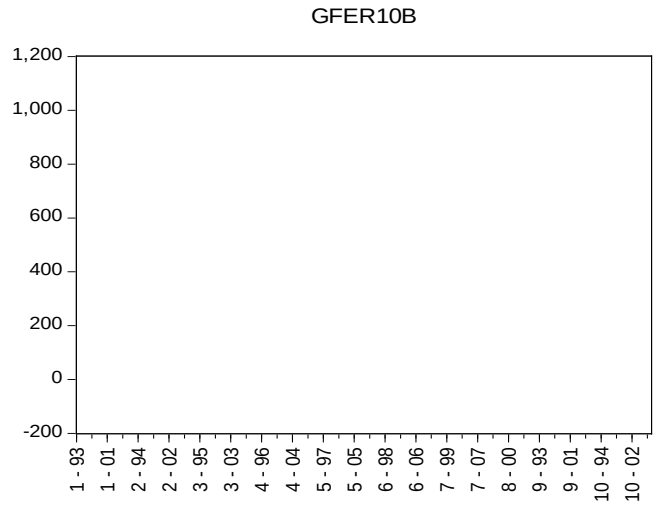
described that Indonesia GFER's shape stay the same, whether it observed far from crisis or close to crisis year (see Figure 4.11 and 4.12).

Figure 4.9
GFER Combined Cross Section Graph (1992-2006)



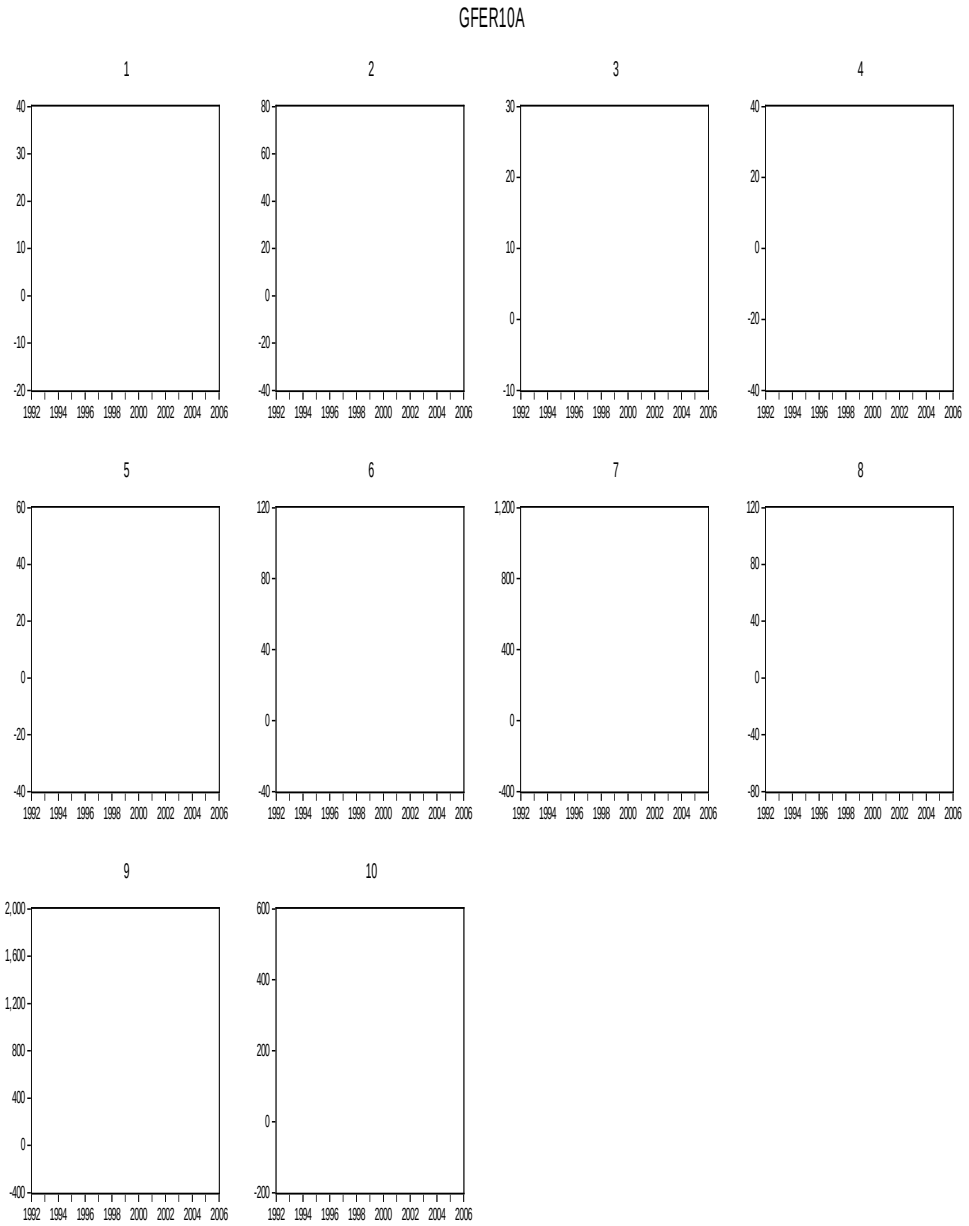
Source: Eviews-6, 2010.

Figure 4.10
GFER Combined Cross Section Graph (1993-2007)



Source: Eviews-6, 2010.

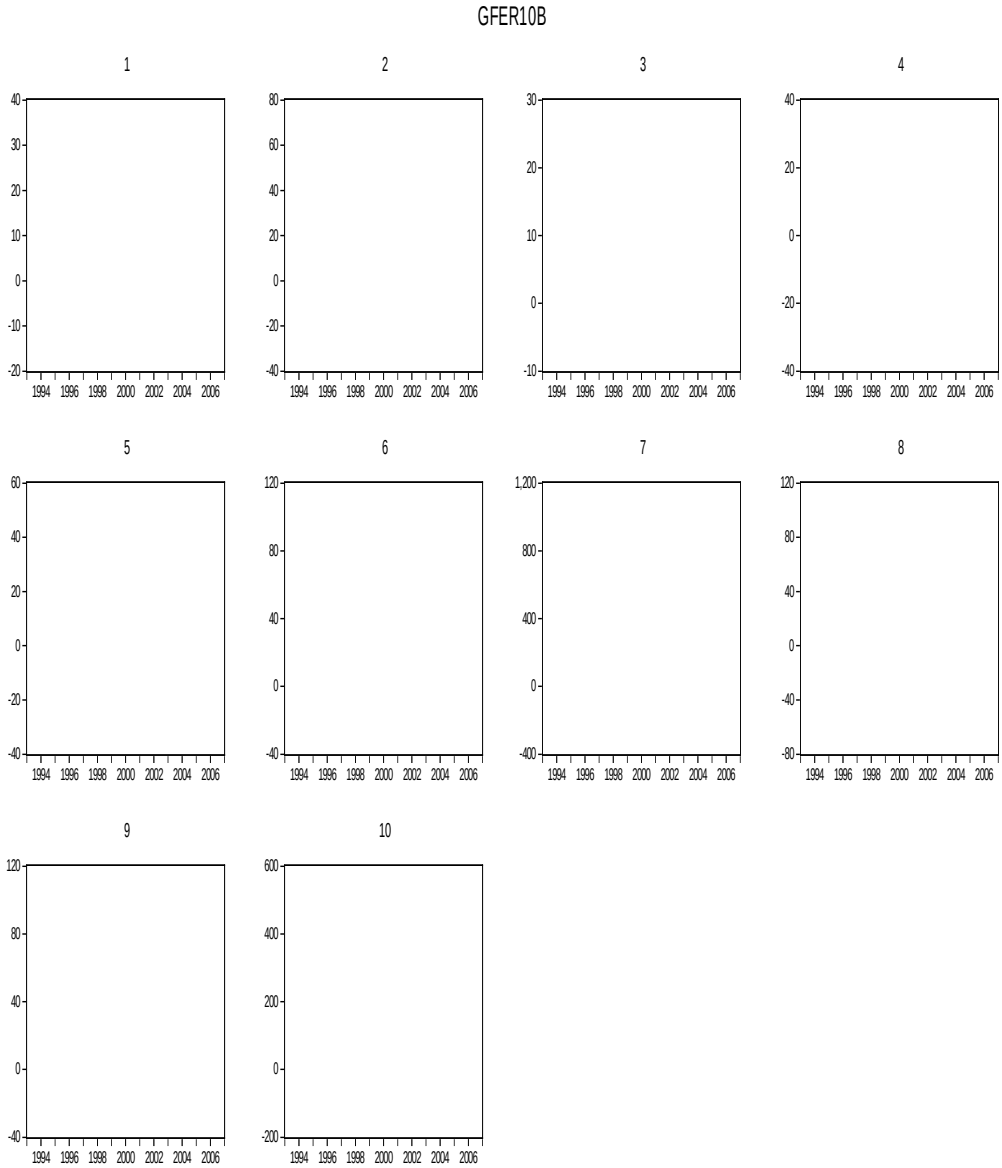
Figure 4.11
GFER Individual Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

Figure 4.12
GFER Individual Cross Section Graph (1993-2007)



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

(16) Growth rates of real volume of trade (GRVT) of ASEAN-10 Analysis (1992-2009)

Growth rates of real volume of trade in this research means the amount of increase the number of shares, bonds or contracts, traded during a given period, for a security, or an entire exchange that adjusted for inflation. In this research GRVT of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2006 as GRVT 1 and 1995-2009 as GRVT 2.

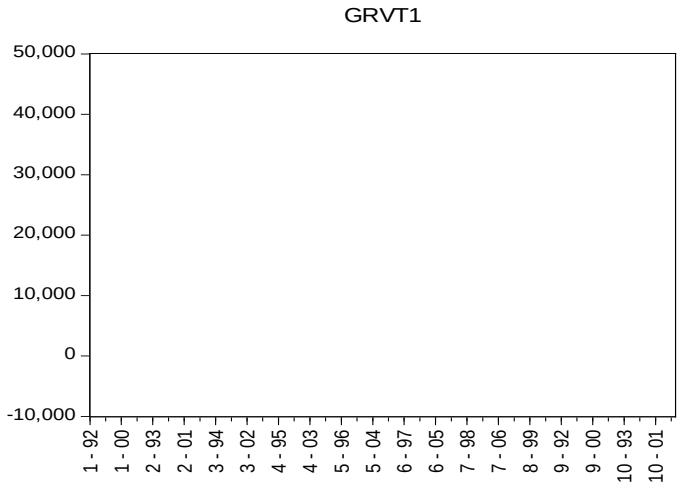
Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.13 and 4.14 are a combined a cross sectional graph which display separate lines for each cross-section in a single graph. Figure 4.15 and 4.16 are individual cross sections which display separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph are a single graph containing the summary of statistics for each period.

Figure 4.13 and 4.14 show in general the summary of statistics of both periods of observation are similar, It means that the selection period is good for regression.

All ASEAN countries that consist: Indonesia, Malaysia, Singapore, Philippines, Thailand, Vietnam, Laos, Myanmar, Brunei Darussalam, Cambodia, are dynamics GRVT individual cross sectional graph on both

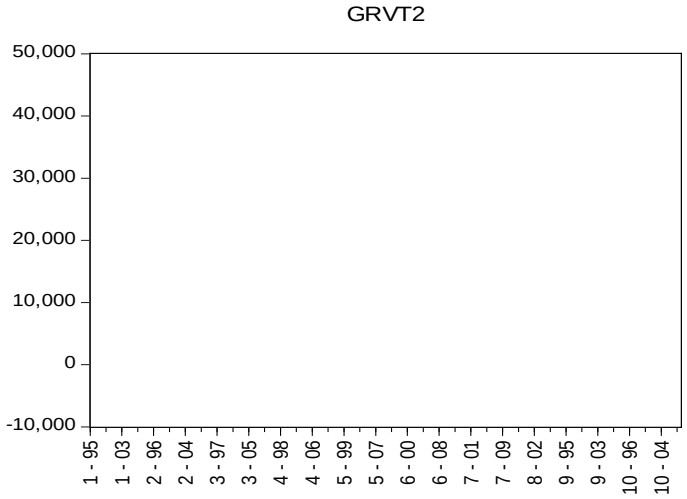
period of time, whereas described that all ASEAN countries GRVT's shape is dynamics, while it observed far from crisis or close to crisis year (see Figure 4.15 and 4.16).

Figure 4.13
GRVT Combined Cross Section Graph (1992-2006)



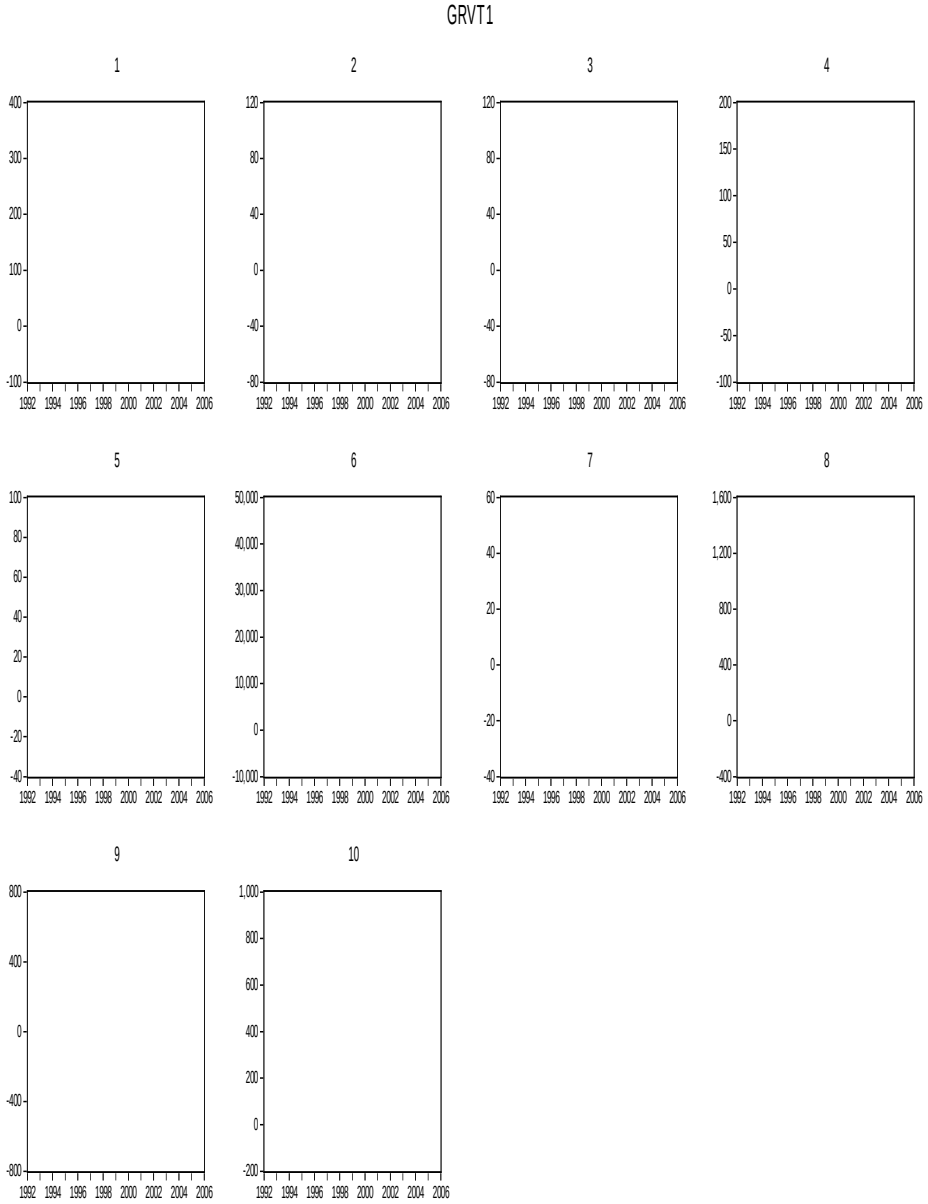
Source: Eviews-6, 2010.

Figure 4.14
GRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.

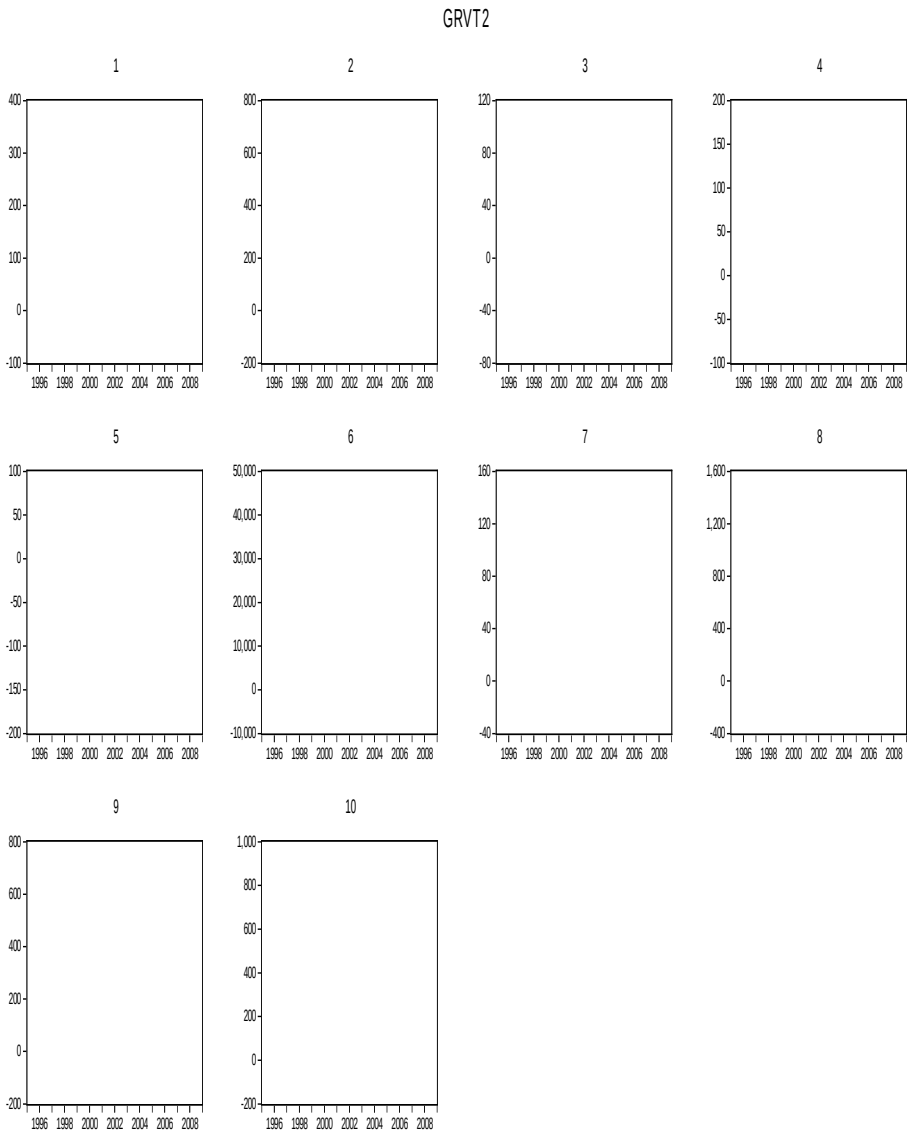
Figure 4.15
GRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

Figure 4.16
GRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

(17) Growth rate of a real relative volume of trade (GRRVT) of ASEAN-10 Analysis (1992-2009)

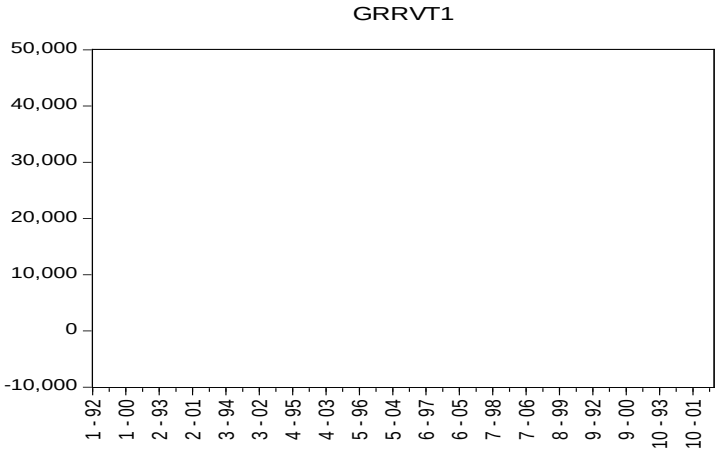
Growth rate of a real relative volume of trade in this research means the amount of increases a measurement of one investment or financial instruments value relative to another's in the number of shares, bonds, or contracts which is, traded during a given period for a security or an entire exchange that adjusted for inflation. In this research GRRVT of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2006 GRRVT 1 and 1995-2009 GRRVT 2.

Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.17 and 4.18 is a combined a cross sectional graph which displays separate lines for each cross-section in a single graph. Figure 4.19 and 4.20 is individual cross sections displays separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph are a single graph containing the summary of statistics for each period.

Figure 4.17 and 4.18 show that in general the summary of statistics of both periods of observation are similar. It means that the selection period is good for regression.

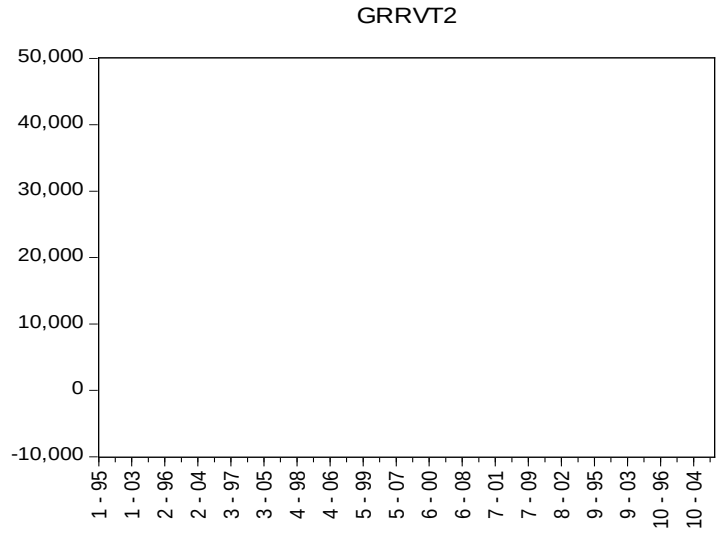
Vietnam GRRVT is described as the only countries which has the same Individual cross sectional graph on both periods of time.Vietnam GRRVT's is stays the same, whether it observed far from crisis or close to crisis year (see Figure 4.19 and 4.20).

Figure 4.17
GRRVT Combined Cross Section Graph (1992-2006)



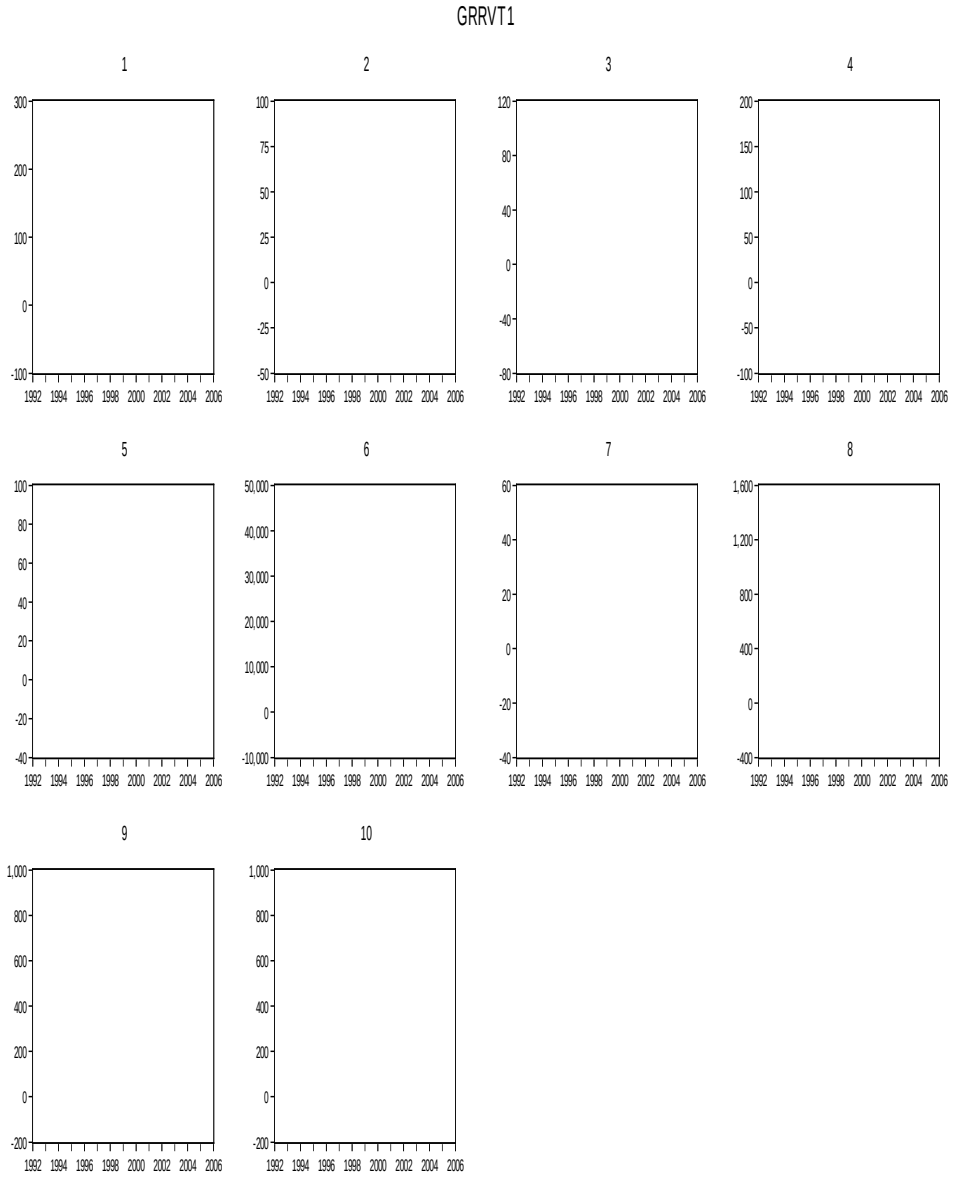
Source: Eviews-6, 2010.

Figure 4.18
GRRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.

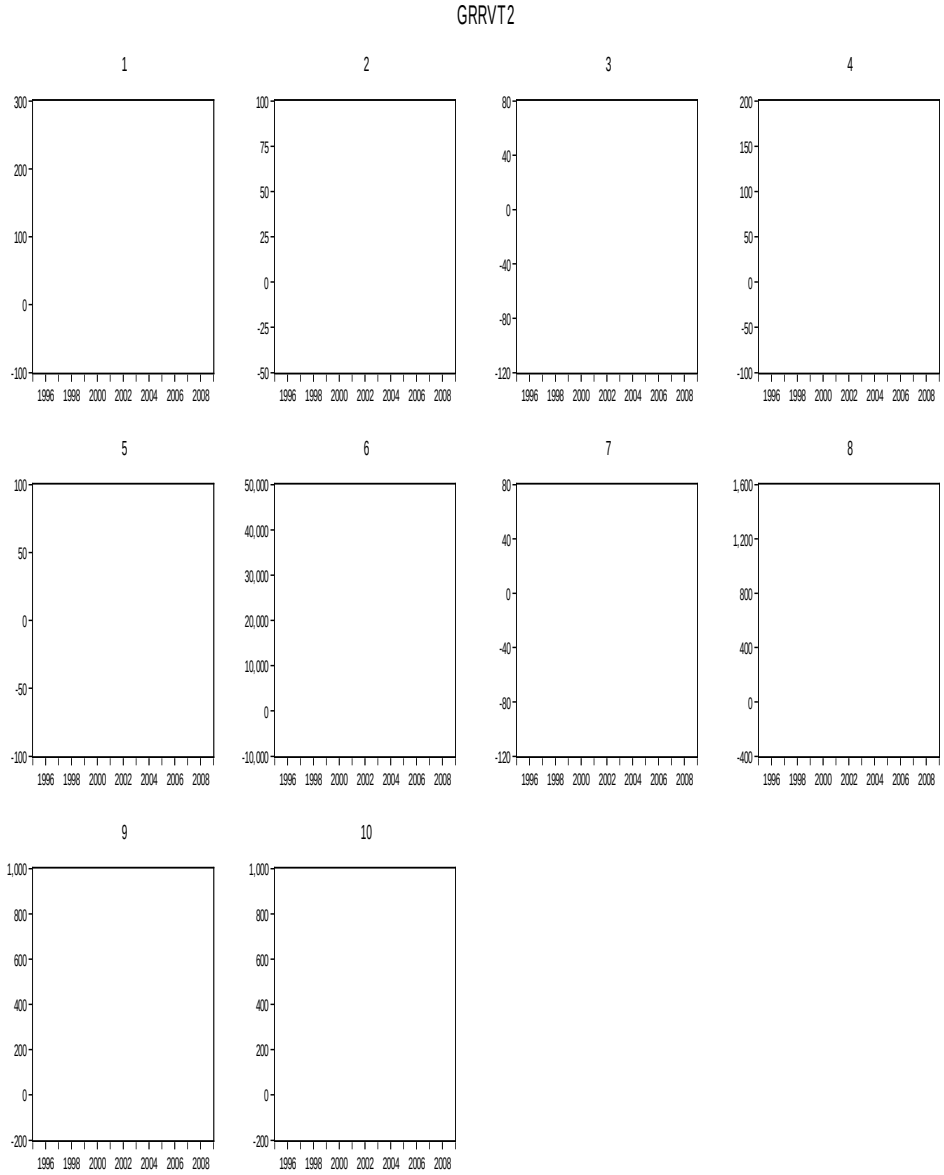
Figure 4.19
GRRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

Figure 4.20
GRRVT Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

(18) Growth rate of real per capita GDP at factor cost (GRYPC) of ASEAN-10 Analysis (1992-2009)

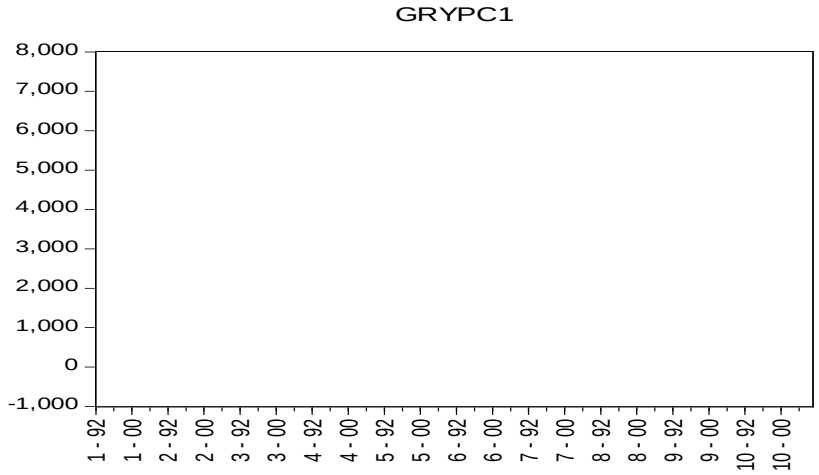
Growth rate of real per capita GDP at factor cost in this research means as the amount of increase an approximation of the value of goods produced per person in the country's GDP divided by the total number of people in the country at the total money, time and resources of a firm engaged in the business of financing accounts receivable which is the activity known as factoring with a purchase or activity that adjusted for inflation. In this research GRYPC of ASEAN-10 that consist: Indonesia, Malaysia, Singapore, Thailand, Philippines, Vietnam, Laos, Cambodia, Myanmar, Brunei Darussalam are selected as raw data. For this panel data regression purpose to sigma convergence, the period of time is divided into 1992-2007 GRYPC 1 and 1994-2009 as GRYPC 2.

Eviews-6 provides tools for displaying time series graphs with panel data. Figure 4.21 and 4.22 is a combined cross sectional graph which displays separate lines for each cross-section in a single graph. Figure 4.23 and 4.24 is individual cross sections displays separate time series graphs for each cross-section. Combined cross section graph and individual cross sections graph are a single graph containing the summary of statistics for each period.

Figure 4.21 and 4.22 show that in generally the summary of statistics of both period of observation are similar. It means that the selection period is good for regression.

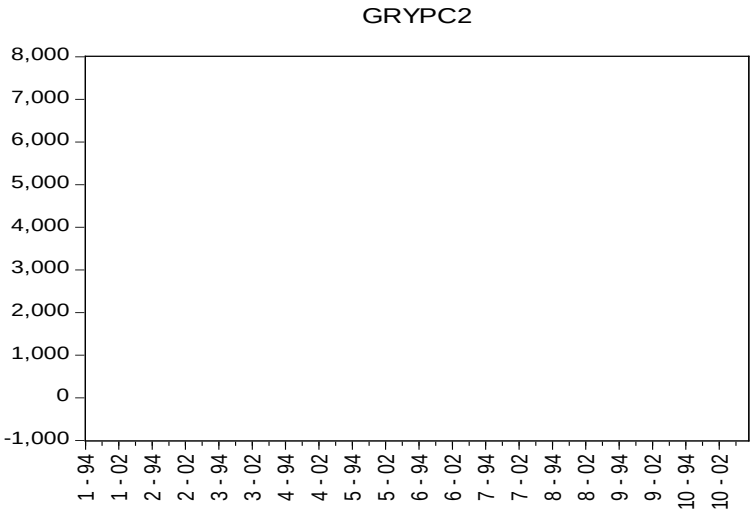
Vietnam GRYPC is described as the only countries which has the same individual cross sectional graph on both periods of time, Vietnam GRYPC is stays the same, whether it observed far from crisis or close to crisis year (see Figure 4.23 and 4.24).

Figure 4.21
GRYPC Combined Cross Section Graph (1992-2006)



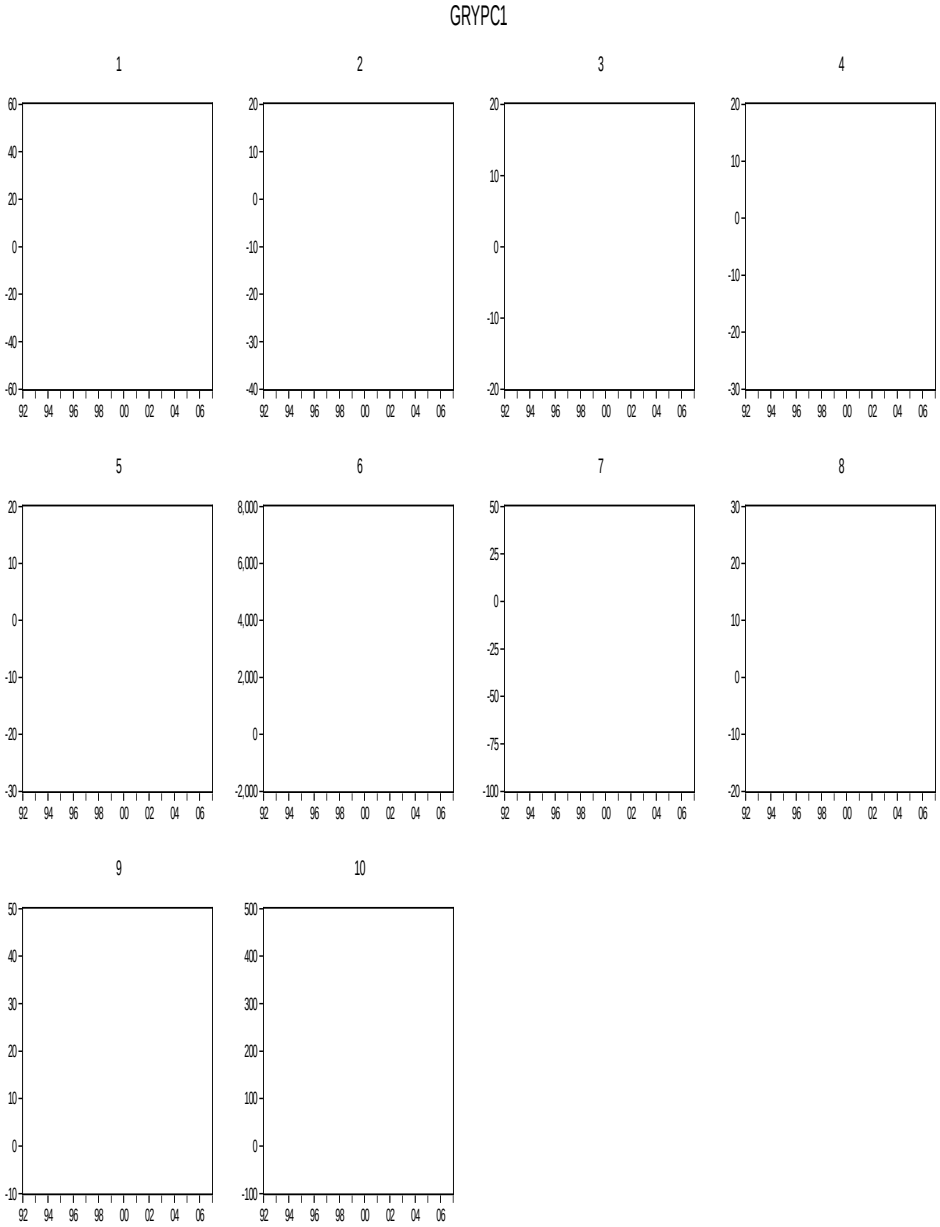
Source: Eviews-6, 2010.

Figure 4.22
GRYPC Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.

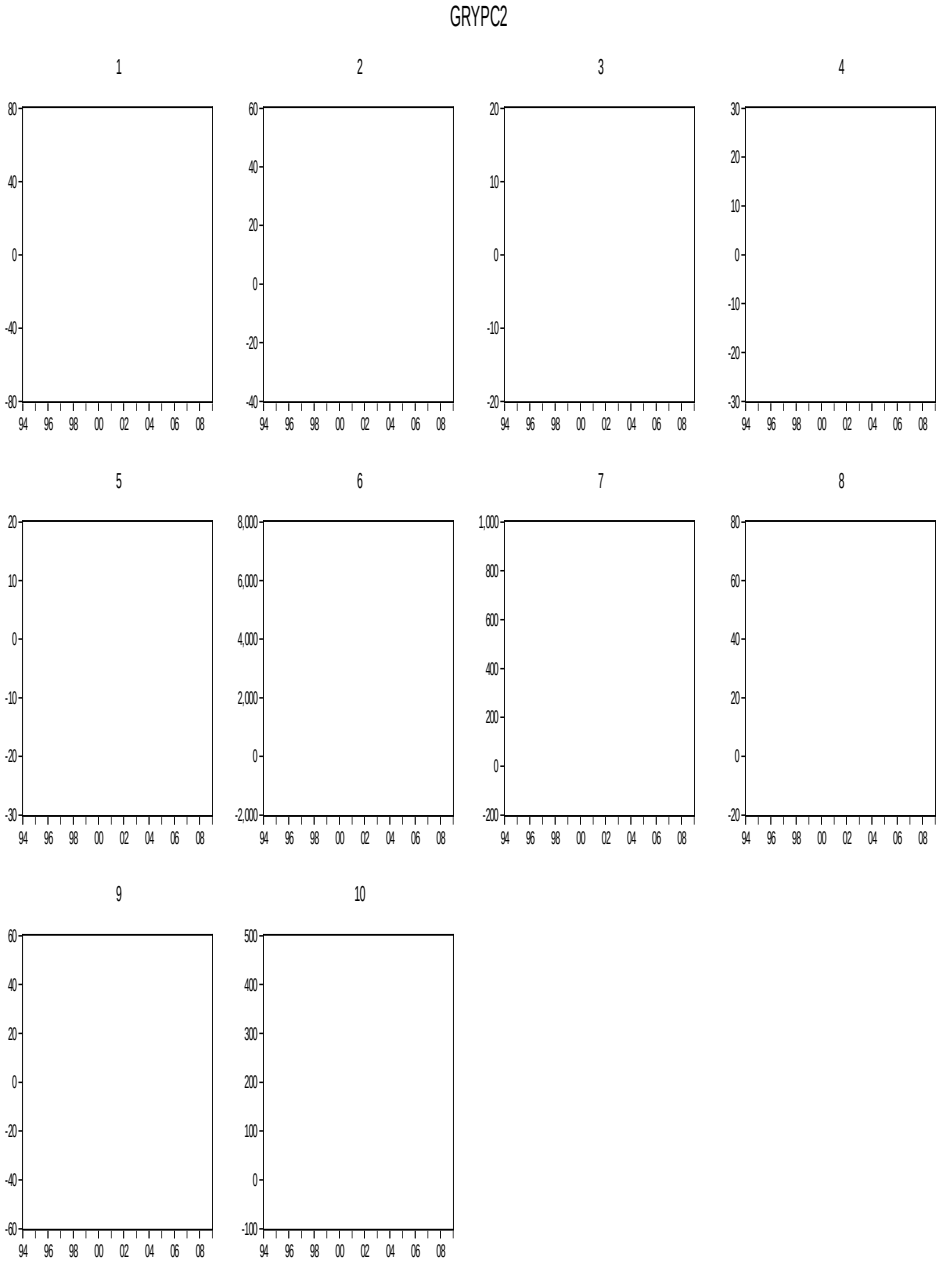
Figure 4.23
GRYPC Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

Figure 4.24
GRYPC Combined Cross Section Graph (1992-2006)



Source: Eviews-6, 2010.
Note:

11. Indonesia
12. Malaysia
13. Singapore
14. Thailand
15. Philippines
16. Laos
17. Brunei Darussalam
18. Cambodia
19. Myanmar
20. Vietnam

4.5.2 Panel Data Analysis

This research used Panel data. Panel data is a group of individuals object, company and etc, in a current period of time of specific unit. Panel data is a combination of *cross section data* and *time series data.* As we know that this model is focuses on the regression analysis and the combination of time series and cross section, which is famous called by pooled time series. There are other names for panel data, such as pooled data (pooling of time series and cross-sectional observations), combination of time series and cross-section data, micropanel data, longitudinal data (a study over time of a variable or group of subjects), event history analysis (e.g., studying the movement over time of subjects through successive states and conditions) (Gujarati, 2003).

From three panel data method approaches, there are two approaches that are commonly used to estimate the regression model in pooled data, they are fixed effect model and random effect model. To determine the method between pooled least square and fixed effect we can test it through F test and Hausman test will be used to determine between random effect and fixed effect (Winarno, 2009).

Haussman test is used to determine between *fixed effect* method and *random effect* method. *Chi Square* value equation of Hausman test, are:

Matrix b_diff = b_fixed – b_random

Matrix var_diff = cov_fixed – cov_random

Matrix qform = @transpose(b_diff)*@inverse(var_diff)*b_diff

Null Hypothesis of Haussman test, are:

H_0 = *random effect*

H_1 = *fixed effect*

If *Chi Square* $_{statistic}$ > *Chi Square* $_{table}$ or in other word, *p*-value > 0.005, where it means that we should reject null hypothesis H_0 and determine that *fixed effect* model is the suitable model to use (Winarno, 2009). Hausman test is also available through *Eviews-6 command program.*

Table 4.1
Hausman Test Result

Test Summary	Chi-Sq. Statistic	*p*-value	Effect
CPI	7.300554	0.0069	Fixed
RER	2.667002	0.1024	Fixed
GFER	4.548718	0.0329	Fixed
GRVT	0.855584	0.3550	Fixed
GRRVT	0.857151	0.3545	Fixed
GRYPC	0.840744	0.3592	Fixed

Source: Eviews-6, 2010.
Note: fixed effect while *p*-value > 0,005

4.5.3 Classic Assumption Test Analysis

e. Normality Test

Normality test is done by examining Jarque-Bera value through X^2 table. From regression through Eviews 6.0 we find that J-B statistics as shown in Table 4.2, where it is described that CPI, RER, GFER, GRVT, GRRVT, and GRYPC, has a normal distribution, where are shown from their μ residual value.

Table 4.2
Normality Test Result

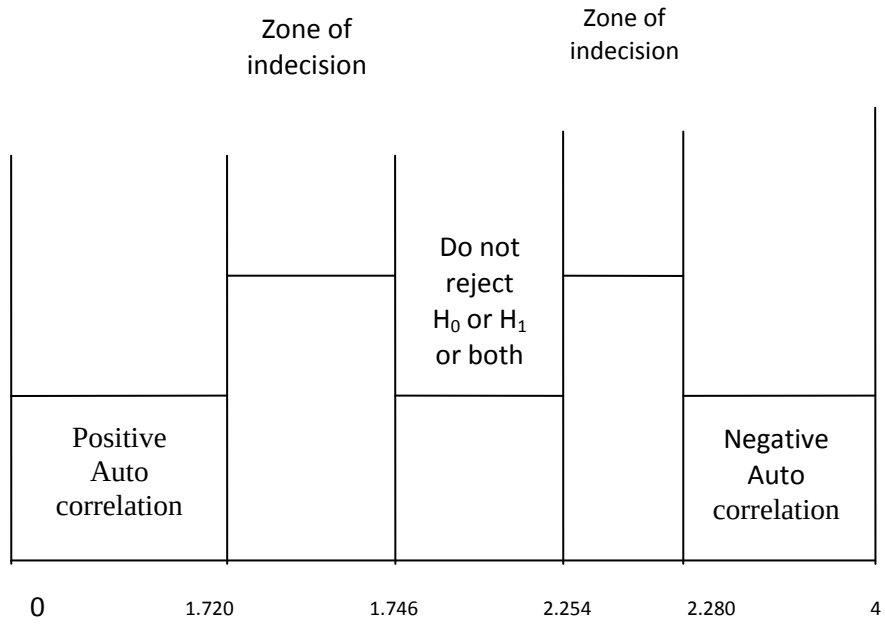
Test Summary	Df	X^2-table	Jarque-Bera	Result
CPI	9.139	23.5893	4.0928	Normal Distribution
RER	9.139	23.5893	1.1423	Normal Distribution
GFER	9.139	23.5893	0.1963	Normal Distribution
GRVT	9.139	23.5893	10.0599	Normal Distribution
GRRVT	9.139	23.5893	15.2685	Normal Distribution
GRYPC	9.139	23.5893	10.6329	Normal Distribution

Source: Eviews-6, 2010.
Note: Jarque-Bera (JB) test method is measuring value of skewness and kurtosis where if JB < X^2 Chi-square value table, it means that residual value distribution is normal (Gujarati, 2003).

f. Autocorrelation Test

One of formal test to detect autocorrelation is Durbin-Watson. This test is based on error model shown below;

Figure 4.25
Durbin-Watson Test



Note:
H0: No positive autocorrelation
H1: No negative autocorrelation

Based on Durbin-Watson, this study found that in this research the equations are generally high potential to be free from autocorrelation, as it is described on Table 4.3.

Table 4.3
Durbin-Watson Test Result

Test Summary	K	dL	Du	Dw	R^2	Dw/R^2	Result
CPI	1	1.720	1.746	1.744521	0.824031	2.117	Negative Autocorrelation
RER	1	1.720	1.746	1.820670	0.932277	1.953	Negative Autocorrelation
GFER	1	1.720	1.746	2.280812	0.228518	9.981	Negative Autocorrelation
GRVT	1	1.720	1.746	2.279058	0.227245	10.029	Negative Autocorrelation
GRRVT	1	1.720	1.746	2.137546	0.153866	13.892	Negative Autocorrelation
GRYPC	1	1.720	1.746	2.266261	0.058549	38.707	Negative Autocorrelation

Source: Eviews-6, 2010.

g. Heteroscedasticity Test

Heteroscedasticity test purpose is to know whether all the disturbance term are similar variants or not (Gujarati, 2003). This research study used White's Heteroscedasticity-Consistent Variances and Standard Errors. White has shown that this estimate can be performed so that there is asymptotically valid (i.e., large-sample) statistically inference can be made about true parameter values. As the preceding result show, (White's) heteroscedasticity-corrected standard errors are considerably larger than the OLS standard errors and therefore the estimated t values are much smaller than those obtained by OLS. On the basis of the latter, both the regressors are statistically significant at the 5 percent level, whereas on the basis of White's estimators they are not. However, it should be pointed out that White's heteroscedasticity-corrected standard errors can be larger or smaller than the uncorrected standard errors (Gujarati, 2003).

Table 4.4
Heteroscedasticity Test Result

Test Summary	Probability	Result
CPI	0.000000	Heteroscedasticity free
RER	0.000000	Heteroscedasticity free
GFER	0.000229	Heteroscedasticity free
GRVT	0.000060	Heteroscedasticity free
GRRVT	0.000146	Heteroscedasticity free
GRYPC	0.000000	Heteroscedasticity free

Source: Eviews-6, 2010.

Through Eviews-6, this research study examined the heteroscedasticity by Eviews-6 Equation Estimation command of White heteroscedasticity-consistent standard errors and covariance, where the result is injured by heteroscedasticity if the probability is significant, in the other side, the result is free from heteroscedasticity if the probability > 0.005. The heteroscedasticity test summary result that described in Table 4.4.

h. Multicollinearity Test

Multicollinearity is a condition that describes a linear relationship across independent variables. Multicollinearity happens when there are more than one independent variables in the research study. Whether this research study independent variable is only one, because of that reason this research study econometric is free from multicollinearity.

4.5.4 Regression Statistic Test Analysis (Hypothesis Test)

d. Jointly Regression Coefficient Test (F-test)

F-test goal is to determine the significance of independent variable groups in influencing the dependent variable. In this research we use 95% degree of freedom (α = 5%). The conclusion of jointly regression coefficient test is described in Table 4.5. It means that independent

variable groups influence the dependent variable. It is significant (H_0 is rejected and H_1 is accepted).

Table 4.5
Jointly Regression Coefficient Test (F test)

Test Summary	Prob (F - statistic)	Result
CPI	0.000000	Significant
RER	0.000000	Significant
GFER	0.000229	Significant
GRVT	0.000060	Significant
GRRVT	0.000146	Significant
GRYPC	0.000000	Significant

Source: Eviews-6, 2010.

e. Individuality Coefficient Regression Test (t-Test)

Individuality coefficient test regression (t-test) can be seen through t-statistic which is described in Table 4.6. The t test purpose is to see if independent variable significantly influences the dependent variable. Parameter of a variable is called as significantly influencing if probability of t statistic < 0.005.

Table 4.6
Individuality Coefficient Regression Test (t-Test)

Test Summary	t-statistic	p-value	Result
CPI	-3.5055	0.0006	Significant
RER	3.5706	0.0005	Significant
GFER	-4.7144	0.0000	Significant
GRVT	-7.1286	0.0000	Significant
GRRVT	-3.5742	0.0005	Significant
GRYPC	-25.1346	0.0000	Significant

Source: Eviews-6, 2010.

f. Determination Coefficient Test of R^2

R^2 test goal is to show whether independent variables are good to explain the dependent variable. R^2 values are 0-1 ($0 < R^2 < 1$). If R^2 value

is 1, the independent variable perfectly explains the dependent variable. Otherwise, if R^2 value is 0 if that the independent variable is not strong enough to explain the dependent variable. This determination coefficient test of R^2 is described in Table 4.7.

Table 4.7
Determination Coefficient Test of R^2

Test Summary	R^2	Result
CPI	0.89	89% Explained the dependent variable , 11% explained by others
RER	0.78	78% Explained the dependent variable, 22% explained by others
GFER	0.21	21% Explained the dependent variable, 79% explained by others
GRVT	0.23	23% Explained the dependent variable, 77% explained by others
GRRVT	0.15	15% Explained the dependent variable, 85% explained by others
GRYPC	0.40	40% Explained the dependent variable, 60% explained by others

Source: Eviews-6, 2010.

4.6 Result Interpretation

This interpretation of this study follows Chowdhury, 2004 (excerpt from Rasheed and Ahmad, 2007) where the sigma convergence model is given as;

$$\sigma_j = \alpha + \beta_j t + \varepsilon_j \quad \ldots\ldots\ldots\

if the regression result is any other value of β coefficient it implies non-convergence.

In Table 4.8, we found out that there are contradicting conditions for CPI, although all the β coefficient of CPI are negative, that means convergence Chowdhury, 2004 (excerpt from Rasheed and Ahmad, 2007), but only in one sample it is statistically significant (p-value < 0.005), this condition showed that inflation has remained unstable due to the unsteady because ASEAN during this period injured by hard crisis of 1997 which is thus not paving the way for price stability, but synchronized movements do demonstrate a possible success of a common currency in the ASEAN region. This condition is almost similar condition to research study of 'The Convergence and The SAARC Common Currency' written by Rasheed and Ahmed (2007).

Table 4.8
Panel EGLS (Cross – Section SUR)
CPI on Time

Observation Period	**1992-2006**	**1995-2009**
	1995-2009	**1992-2006**
Coefficient β	-0.0744	-0.0487
***p*-value**	0.0006	0.3041
R^2	0.82	0.89

Source: Eviews-6, 2010.

Table 4.9
Panel EGLS (Cross – Section SUR)
RER on Time

Observation Period	**1992-2006**	**1995-2009**
	1995-2009	**1992-2006**
Coefficient β	-0.0351	-0.0168
***p*-value**	0.3472	0.8464
R^2	0.96	0.93

Source: Eviews-6, 2010.

This research study time period consists of two historical crises. The first crisis happened in 1997 which is often called as East Asian Crisis. Thailand was

one of ASEAN member countries, where was injured by this crisis. Then, this crisis also gave a bad impact to others ASEAN countries, as: Indonesia, Malaysia, Singapore, Philippines, Vietnam, Laos, Myanmar, Cambodia, Brunei Darussalam. The second crisis is called Global crisis that happened in U.S (United Stated of America), which gave impact to the whole world. The negative impact happened to the whole world on real exchange rate (RER) which was shown by the p-value that not significant in whole period of time in this research study, this condition is described in Table 4.9. The table shows that, ASEAN exchange rate is fragile while it was hit by hard crises. This condition is a proof that ASEAN countries are not suitable with floating exchange rate system. Which depends on U.S dollar. As we know U.S dollar is not backed by gold anymore after the Bretton Woods agreement was breakdown in 1970. Table 4.9 also shows that RER in whole period of time in this research study which consists both historical crises, are Convergence. The β coefficients of the RER are negative. This means that RER does reflect a case of a monetary union in ASEAN region.

Table 4.10
Panel EGLS (Cross – Section SUR)
GFER on Time

Observation Period	**1992-2006** **1995-2009**	**1995-2009** **1992-2006**
Coefficient β	-0.0608	-0.2623
***p*-value**	0.0000	0.0000
R^2	0.22	0.20

Source: Eviews-6, 2010.

Table 4.10 shows that all the estimated coefficients are found to be statistically significant. This table also describes that all of the β coefficients are negative. It means that the growth rate of foreign exchange reserves is

Convergence. This indicates that there is a harmonized GFER through ASEAN countries member. This condition will help establish a currency union in ASEAN region.

Table 4.11
Panel EGLS (Cross – Section SUR)
GRVT on Time

Observation Period	1992-2006	1995-2009
	1995-2009	1992-2006
Coefficient β	-0.1629	-0.0769
p-value	0.0000	0.0000
R^2	0.23	0.23

Source: Eviews-6, 2010.

From Table 4.11, it is apparent that all the time periods in this research study estimated β coefficient for the growth rate volume of trade are negative and statistically significant. The growth in trade volume (GRVT), therefore, thus seems to be synchronizing and presenting a case of a successful formation of a common currency.

Table 4.12
Panel EGLS (Cross – Section SUR)
GRRVT on Time

Observation Period	1992-2006	1995-2009
	1995-2009	1992-2006
Coefficient β	-0.2298	-0.1202
p-value	0.0005	0.0007
R^2	0.21	0.15

Source: Eviews-6, 2010.

Presenting the case of the growth rate of relative trade volume in Table 4.12, we find significant and negative β coefficient values for the whole periods in this research study observations. This observation further of GRRVT strengthens the possibility of a single currency case.

Table 4.13
Panel EGLS (Cross – Section SUR)
GRYPC on Time

Observation Period	**1992-2006**	**1995-2009**
	1995-2009	**1992-2006**
Coefficient β	-0.0592	-0.0948
***p*-value**	0.0000	0.0000
R^2	0.06	0.40

Source: Eviews-6, 2010.

Finally, for the growth rate of per capita real GDP we have to use annual data of 1992-2006 and 1995-2009 where the observation is larger than other variables in this research. This research can observe a whole condition in the whole the growth rate of per capita real GDP 1992-2009 periods of time completely. The results of β coefficient value are presented in Table 4.13 where the β value was found negative for all equation coefficients. Although there is only one that significant, where is described that there is a big hard impact due to 1997 crisis to the growth rate of per-capita real GDP at that time period but, thus still showing a high likelihood of forming a successful single currency through the convergence result of all the GRYPC in the whole period of time in this research study.

Finally this research found, where this research has been differentiate the method of the study from the previous study of Chaudhury (2009), because this research found out from EMU study by Keenan (2002) research that written by Keenan that conclude the weaknesses of OCA, and now there are no reasons for this research to follow the previous study of Chaudhury (2009) that used OCA, and latter we finally decided that better use Convergence criterion with their

whole advantages and benefits. The important analysis result σ convergence model in this research are: if the result of regression shows a negative value of β coefficient, it indicates the possibility of convergence, while, if the regression result is any other value of β coefficient it implies non-convergence (Chowudhury, 2004) in Rasheed and Ahmad (2007).

We found out that there are contradicting conditions for CPI in this research, although all the β coefficient of CPI are negative, but only in one sample it is statistically significant (p-value < 0.005). This condition is almost similar condition to research study of 'The Convergence and The SAARC Common Currency' written by Rasheed and Ahmed (2007).

RER in whole period of time in this research study which consists both historical crises, are Convergence. The β coefficients of the RER are negative. This means that RER does reflect a case of a monetary union in ASEAN region. The growth rate of foreign exchange reserves is Convergence. This indicates that there is a harmonized GFER through ASEAN countries member. This condition will help establish a currency union in ASEAN region. The GRVT thus seems to be synchronizing and presenting a case of a successful formation of a common currency. The further observation of GRRVT strengthens the possibility of a single currency case, where the result are significant and negative β coefficient values for the whole periods in this research study of GRRVT observations. Although there is only one that significant, where is described that there is a big hard impact due to 1997 crisis to the growth rate of per-capita real GDP at that time period but, thus still showing a high likelihood of forming a

successful single currency through the convergence result of all the GRYPC in the whole period of time in this research study.

The result of this study described that the first previous study of Kazushi, Shimizu, (2001) where it suggest that monetary integration should be studied after deepening market integration by the development of AFTA, it was true. And also it was support by the second previous study of Madhur, Srinivasa, (2002) where it viewed from this perspective, that the launching of the AFTA and the regional resources sharing arrangements under the Chiang Mai Initiative may perhaps posses the potential to gradually lead to greater regional monetary cooperation.

The result of this study answered the third previous study that was written by Bunyaratavej, Kraiwinee, (2003), where the research of them described that the ASEAN region as a whole may not be an ideal candidates for forming a currency union, as GDP per capita displays a high degree of heterogeneity, by the fact that it might be happen to ASEAN-6 as their research focus, although the forth previous study that written by Ramayandi, Arief, (2005), result The five largest ASEAN countries seem to be suitable candidates to begin with. In the other side while the research focus apply in the full integration of ASEAN-10, the answered sound be different, where through the convergence of this study result, it totally proved that there are likely to be considerable benefits while apply monetary union of common currency area after full integration of ASEAN-10 takes place, as support by the fifth previous study that was written by Thangavelu, Shandre M. (2008), and the sixth previous study that was written by Chaudhury, Rafi, (2009).

CHAPTER V

CONCLUSIONS, LIMITATIONS, AND FUTURE RESEARCH AGENDA

5.1 Conclusions

Table 5.1 describes that the result of interpretation of ASEAN-10 countries six economic indicators that consist of; CPI, RER, GFER, GRVT, GRRVT, and GRYPC, are *Convergence*. This result proved the hypotheses of this research study, there are:

1. There is a good prospect of forming a common currency area in ASEAN-10 that consist of Indonesia, Brunei Darussalam, Malaysia, Philippines, Thailand, Singapore, Vietnam, Myanmar, Laos, and Cambodia. The six economic indicators that consist of; (1) Consumer Price Indices (CPI), (2) Real Exchange Rate in US dollars (RER), (3) Growth rates of Foreign Exchange Reserves (GFER), (4) Growth rates of Real Volume of Trade (GRVT), (5) Growth rate of Real Relative Volume of Trade (GRRVT), (6) Growth rates of Per Capita Real GDP at factor cost (GRYPC), are supporting the feasibility of ASEAN-10 countries to creating common currency area.
2. This research result that there is a possibility for convergence model to be alternative of OCA (Optimum Currency Area) model in term of evaluate the feasibility of common currency area.

Table 5.1
Result Interpretation

Test Summary	β coefficient value	Result
CPI	Negative	Convergence
RER	Negative	Convergence
GFER	Negative	Convergence
GRVT	Negative	Convergence
GRRVT	Negative	Convergence
GRYPC	Negative	Convergence

Source: Eviews-6, 2010.

5.2 Limitations and Future Research Agenda

1. This research only observed the feasibility of ASEAN-10 countries for 'Common Currency Area' by forming six economic indicators that consist of; CPI, RER, GFER, GRVT, GRRVT, and GRYPC.
2. Although in the main journal there are seven economic indicators that consist of; Call Money Rate, CPI, RER, GFER, GRVT, GRRVT, and GRYPC, in this research study author omitted Call Money Rate economic indicator, because six economic indicators in this research study are enough to support the research model.
3. Call Money Rate indicator is omitted because of the difficulties in collecting data. The data are not available for ASEAN-10 countries.
4. Further study will certainly be required in order to advance the ASEAN-10 Single Currency, because this research study is still in the second stage of 'The Transition to Monetary Union' according to (Yuen, 1999).

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CPI
(Consumer Price Index)

	COUNTRY NAME	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	104.63	117.3	128.7	139.7	153.2	165.2	175.4	277.1	334.6	347.5
2	Malaysia	105.91	109.3	113.1	117.4	85.9	125.6	129	135.8	139.6	100
3	Singapore	102.2	105.8	108.2	111.5	96.7	115	117.4	117	117.1	101.1
4	Thailand	101.2	110	113.7	119.5	82.8	133.8	141.2	152.7	153.2	101.9
5	Philippines	112.88	129.3	139.1	151.7	108	175.6	185.8	203.9	217.4	152.3
6	Laos	97.03	124.4	133.5	142.5	170.4	190.8	228.2	433.7	990.6	108.4
7	Brunei	83.48	84.58	88.17	90.34	95.73	97.64	99.32	98.88	98.47	100
8	Cambodia	29	58	60.32	7.35	1.06	10.07	3.17	14.81	4.01	0.79
9	Myanmar (Burma)	97.5	125.96	161.3	212.4	263.9	306.86	384.1	498.1	754.6	893.4
10	Vietnam	88.31	252.3	273.3	298.9	347.4	105.7	109.1	117.6	122.6	419

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	391.11	433.5	462	141.27	156.03	145.89	148.67	113.86	113.78
2	Malaysia	101.42	103.2	104.4	105.86	108.99	102.6	105	114.2	112.5
3	Singapore	102.1	101.7	102.2	100	100.4	101.4	103.5	110.3	110.5
4	Thailand	103.5	104.2	106.1	95.3	96.8	99	100	102.3	102.6
5	Philippines	161.6	166.4	171.4	120.6	129.8	137.9	141.8	155	160
6	Laos	116.8	129.3	149.3	164.9	176.7	188.7	197.3	203.6	200.3
7	Brunei	100.6	98.27	98.53	99.36	100.57	102	102.8	105.6	107.4
8	Cambodia	0.6	3.21	1.22	107.94	114.03	121.46	142.03	126.9	134
9	Myanmar (Burma)	151.7	288.6	394.3	271.6	297.05	375.17	498.6	630.23	754.38
10	Vietnam	434.4	448.5	462.4	114.9	124.38	133.71	144.8	178.1	190.39

RER

(Real Exchange Rate in US dollars)

	COUNTRY NAME	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	3.430	3283.05	3441.92	3437.72	3290.09	5769.65	6683.17	4891.06	6259.49
2	Malaysia	5	4.78	4.76	6.75	5	7	6	6	9
3	Singapore	3	2.97	2.86	3.33	3	3	3	3	4
4	Thailand	45	44.98	45.88	69.41	44	73	55	56	96
5	Philippines	38	39.88	35.18	55.38	34	47	44	43	74
6	Laos	1.124	1076.84	1102	1235.93	1117.18	2512.09	2273.89	1772.19	17186.51
7	Brunei	3	2.67	2.53	2.27	2	2	3	3	3
8	Cambodia	6.728	7652.57	76560.86	543766.5	61439.78	237014.3	58742.82	217153.2	1120648
9	Myanmar	10	7.69	5.99	4.95	4	4	3	2	2
10	Vietnam	8.170	7945.11	8079.99	7234.91	24055.58	25	27	26	8

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	5904.91	5071.88	1028.4	11553.78	11273.46	13422.9	12937.31	16718.52	18436.26
2	Malaysia	8	9	10	7	7	7	7	6.37	6.4
3	Singapore	4	4	5	3	3	3	3	2.87	2.77
4	Thailand	95	102	102	83	82	82	80	70.88	70.35
5	Philippines	71	78	89	86	85	81	76	63.24	60.1
6	Laos	18042.16	20313.12	19199.04	12051.56	11789.07	11571.14	10893.82	9971.07	9459.75
7	Brunei	3	3	3	3	3	3	3	3.16	3.19
8	Cambodia	1441578	301105.5	894308.2	7004.46	6931.06	6798.66	6066.53	6766.48	6569.7
9	Myanmar	10	5	4	4	4	3	1	0.43	0.34
10	Vietnam	8	8	9	25	25	24	23	19.02	18.8

GFER

(Growth rates of Foreign Exchange Reserves)

	COUNTRY NAME	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	11.26	7.92	7.57	12.57	33.93	-9.72	39.24	17.16	7.75
2	Malaysia	61.06	59.76	-7.18	-7.81	13.99	-23.48	23.56	19.98	-7.54
3	Singapore	16.87	21.16	20.54	18.03	11.88	-7.34	5.05	2.6	4.2
4	Thailand	15.76	20.32	19.96	27.77	4.87	-30.91	10.65	18.89	-5.54
5	Philippines	34.43	6.14	29.48	6.32	58.66	-27.71	27.46	43.65	-1.28
6	Laos	40.35	52.68	-17.08	55.91	104.05	-37.42	6.53	-4.72	37.33
7	Brunei	20.57	-3.65	76.76	34.05	2.16	533.23	-47.37	-97.41	-20.99
8	Cambodia	-66.58	45.82	1107.06	72.32	42.59	13.76	9.69	-59.53	81.54
9	Myanmar (Burma)	8.48	8.04	39.41	32.98	-59.17	9	25.97	-15.67	-16
10	Vietnam	1622.22	-13.93	116.83	50.73	30.17	14.8	1.35	66.26	2.75

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	-1.6	13.7	12.97	-0.05	-5.18	24.11	3.8	25.58	-3.25
2	Malaysia	4.38	13.22	31.93	51.75	6.87	17.8	0.58	27.49	-0.38
3	Singapore	-5.73	8.53	17.05	17.15	3.45	17.37	0.36	13.94	8.69
4	Thailand	1.3	17.6	7.68	18.39	4.13	28.99	2.81	11.97	1317.33
5	Philippines	2.9	-1.14	2.44	-4.02	21.73	25.89	15.48	45.01	8.53
6	Laos	-8.18	45.49	2.13	9.72	5.93	41.76	7.09	53.6	48.98
7	Brunei	-4.14	11.84	9.99	4.89	-2.16	-6.92	35.87		
8	Cambodia	-14.06	237.36	28.57	15.8	14.79	860.69	-87.17	17.79	177.74
9	Myanmar (Burma)	79.45	17.5	17.07	22.17	14.64	60.33	1.02	41.18	28.38
10	Vietnam	7.14	12.59	50.98	13.16	28.53	47.88	1.55	26.27	32.75

GRVT

(Growth rates of Real Volume of Trade)

	COUNTRY NAME	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	-42.35	93.27	2.03	8.77	-0.04	-3.38	-49.35	-20.88	26.62
2	Malaysia	41.15	11.13	22.91	75	-29.31	-2.01	-20.73	10.88	67.71
3	Singapore	15.73	-33.32	109.83	40.41	-50.4	-1.36	49.23	4.93	-23.69
4	Thailand	22.11	9.99	13.49	85.16	-37.64	-11.16	-25.25	10.97	82.36
5	Philippines	9.34	9.49	10.46	79.2	-26.81	10.12	-12.61	6.57	58.42
6	Laos	0.64	28.46	40.53	-16.37	-0.77	-8.03	-52.17	-64.97	813.84
7	Brunei	-1.3	17.14	-2.4	4.05	-22.47	35.9	12.63	0.42	-36.1
8	Cambodia	-50	-4	949.92	1202.01	-81.32	358.03	-78.59	269.33	407.59
9	Myanmar	595.32	-526.55	-8.97	5.25	-17.5	10.41	-0.78	-39.42	-1.13
10	Vietnam	-64.99	-43.45	3.79	16.77	937.89	13.03	-7.23	9.62	-63.42

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	-18.77	-7.71	-1.65	301.13	15.49	28.18	13.33	31.67	29.88
2	Malaysia	-54.75	105.82	3.47	-6	49.4	13.82	8.25	781.85	-29.11
3	Singapore	-14.7	89.03	12.3	-0.88	48.31	34.5	1.77	-0.09	-23.05
4	Thailand	-4.55	4.02	15.93	-48.3	187.39	11.01	13.22	-6.25	34.47
5	Philippines	-17	5.88	0.77	31.03	10.54	11.36	4.7	-187.6	1.29
6	Laos	-7.19	-20.96	11.35	-17.1	42884.87	61.83	41.64	42.64	-99.67
7	Brunei	11.9	16.99	-0.26	14.24	50.62	7.27	-8.8	120.07	15.59
8	Cambodia	31.67	-64.32	175.64	-98.08	56.94	27.81	-3.63	121.22	4.73
9	Myanmar	664.87	-46.04	-38.06	43.11	-4.67	28.2	-10.32	92.17	-11.97
10	Vietnam	-0.33	12.48	21.24	279	50.64	8.35	23.29	82.41	-0.04

GRRVT

(Growth rates of Real Relative Volume of Trade)

	COUNTRY NAME	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	-34.7	131.39	4.39	11.8	2.54	-1.83	-44.68	-25.28	26.59
2	Malaysia	59.87	33.05	25.76	79.89	-27.49	-0.45	-13.42	4.72	67.67
3	Singapore	31.08	-20.17	114.69	44.33	-49.12	0.21	62.97	-0.89	-23.71
4	Thailand	38.3	31.69	16.11	90.33	-36.02	-9.74	-18.37	4.81	82.32
5	Philippines	23.84	31.08	13.02	84.19	-24.92	11.88	-4.56	0.65	58.38
6	Laos	13.99	67.34	-0.02	-14.04	1.79	-6.56	-47.76	-66.92	813.63
7	Brunei	11.79	44.49	-0.36	6.95	-20.47	38.07	22.99	-5.16	-36.11
8	Cambodia	-43.37	15.12	0.21	1238.35	-80.84	365.35	-76.62	248.81	407.48
9	Myanmar	36.99	9.85	-0.08	8.18	-15.36	12.17	8.35	-42.77	-1.15
10	Vietnam	-60.35	-16.54	-0.1	20.03	964.73	14.84	1.31	3.53	-63.43

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	-4.03	-19.12	-18.11	244.05	11.26	15.25	3.69	-84.13	76.39
2	Malaysia	-46.54	80.37	-13.84	-19.38	43.94	2.34	-0.97	6.28	-3.72
3	Singapore	0.78	65.65	-6.49	-14.98	42.89	20.93	-6.89	-87.96	4.51
4	Thailand	12.77	-8.84	-3.47	-55.66	176.89	-0.19	3.58	-88.7	82.63
5	Philippines	-1.99	-7.21	-16.09	12.38	6.5	0.12	-4.21	-89.44	37.56
6	Laos	9.65	-30.73	-7.29	-28.9	41313.67	45.5	29.58	-91.32	-99.56
7	Brunei	32.2	2.53	-16.95	-2.01	45.12	-3.55	-16.57	-86.69	56.98
8	Cambodia	55.56	-68.73	129.51	-98.35	51.21	14.91	-11.84	-85.84	42.23
9	Myanmar	803.65	-52.7	-48.41	22.74	-8.14	15.25	-17.94	-90.27	19.54
10	Vietnam	17.75	-1.43	0.95	225.07	45.14	-2.58	12.79	-87.79	35.75

GRYPC

(Growth rates of Per Capita Real GDP at Factor Cost)

	COUNTRY NAME	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	6.77	11.81	10.29	12.66	10.93	-6.41	-56.36	44.74	16.33
2	Malaysia	17.23	10.13	8.44	16.2	10.65	-3.16	-29.69	7.09	11.58
3	Singapore	11.76	14.05	17.76	15.71	5.49	0.19	-16.87	-0.48	10.39
4	Thailand	11.92	10.69	14.16	14.79	6.99	-17.83	-26.62	8.29	-0.64
5	Philippines	13.99	0.33	15.28	13.17	9.42	-2.66	-22.46	14.54	-2.26
6	Laos	6.53	14.41	13.12	11.34	3.69	-8.87	-28.28	11.36	16.94
7	Brunei	2.25	-1.64	4.53	16.06	-1.83	-4.63	-25.83	5.41	-0.01
8	Cambodia	17.34	23.65	7.09	20.2	-0.84	-4.15	-11.26	10.59	1.89
9	Myanmar	-1.8	29.79	23.96	44.04	-0.57	22.59	6.67	-0.61	4.53
10	Vietnam	0.58	31.01	21.27	25.05	16.79	7.19	-0.04	4.06	8.51

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	-4.05	20.33	18.39	7.93	10.22	25.59	-30.98	7.29	75.69
2	Malaysia	-4.62	5.98	7.19	11.82	8.42	12.04	-15.76	5.98	46.96
3	Singapore	-10.33	2.03	4.51	14.79	6.11	11.93	-10.85	8.59	13.91
4	Thailand	-6.73	8.82	11.43	12.14	8.3	16.15	-4.65	6.08	28.09
5	Philippines	-7.97	5.85	1.78	6.94	11.49	16.72	-7.15	15.41	16.17
6	Laos	-0.56	2.68	15.37	15.44	13.1	16.04	7158.6	6.97	65.55
7	Brunei	-5.5	-0.02	8.37	13.18	14.15	-89.51	41.75	882.185	108.73
8	Cambodia	6.24	5.62	5.08	12.38	15.39	13.85	-5.91	-11.42	70.12
9	Myanmar	5.92	14.31	-0.01	-1.08	-1.33	1.88	20.03	6.09	-40.08
10	Vietnam	2.89	6.49	11.13	407.92	10.09	10.11	2.27	-16.08	7.61

CPI
(Consumer Price Index)

	COUNTRY NAME	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	104.63	117.3	128.7	139.7	153.2	165.2	175.4	277.1	334.6	347.5
2	Malaysia	105.91	109.3	113.1	117.4	85.9	125.6	129	135.8	139.6	100
3	Singapore	102.2	105.8	108.2	111.5	96.7	115	117.4	117	117.1	101.1
4	Thailand	101.2	110	113.7	119.5	82.8	133.8	141.2	152.7	153.2	101.9
5	Philippines	112.88	129.3	139.1	151.7	108	175.6	185.8	203.9	217.4	152.3
6	Laos	97.03	124.4	133.5	142.5	170.4	190.8	228.2	433.7	990.6	108.4
7	Brunei	83.48	84.58	88.17	90.34	95.73	97.64	99.32	98.88	98.47	100
8	Cambodia	29	58	60.32	7.35	1.06	10.07	3.17	14.81	4.01	0.79
9	Myanmar (Burma)	97.5	125.96	161.3	212.4	263.9	306.86	384.1	498.1	754.6	893.4
10	Vietnam	88.31	252.3	273.3	298.9	347.4	105.7	109.1	117.6	122.6	419

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	391.11	433.5	462	141.27	156.03	145.89	148.67	113.86	113.78
2	Malaysia	101.42	103.2	104.4	105.86	108.99	102.6	105	114.2	112.5
3	Singapore	102.1	101.7	102.2	100	100.4	101.4	103.5	110.3	110.5
4	Thailand	103.5	104.2	106.1	95.3	96.8	99	100	102.3	102.6
5	Philippines	161.6	166.4	171.4	120.6	129.8	137.9	141.8	155	160
6	Laos	116.8	129.3	149.3	164.9	176.7	188.7	197.3	203.6	200.3
7	Brunei	100.6	98.27	98.53	99.36	100.57	102	102.8	105.6	107.4
8	Cambodia	0.6	3.21	1.22	107.94	114.03	121.46	142.03	126.9	134
9	Myanmar (Burma)	151.7	288.6	394.3	271.6	297.05	375.17	498.6	630.23	754.38
10	Vietnam	434.4	448.5	462.4	114.9	124.38	133.71	144.8	178.1	190.39

RER

(Real Exchange Rate in US dollars)

	COUNTRY NAME	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	3.430	3283.05	3441.92	3437.72	3290.09	5769.65	6683.17	4891.06	6259.49
2	Malaysia	5	4.78	4.76	6.75	5	7	6	6	9
3	Singapore	3	2.97	2.86	3.33	3	3	3	3	4
4	Thailand	45	44.98	45.88	69.41	44	73	55	56	96
5	Philippines	38	39.88	35.18	55.38	34	47	44	43	74
6	Laos	1.124	1076.84	1102	1235.93	1117.18	2512.09	2273.89	1772.19	17186.51
7	Brunei	3	2.67	2.53	2.27	2	2	3	3	3
8	Cambodia	6.728	7652.57	76560.86	543766.5	61439.78	237014.3	58742.82	217153.2	1120648
9	Myanmar	10	7.69	5.99	4.95	4	4	3	2	2
10	Vietnam	8.170	7945.11	8079.99	7234.91	24055.58	25	27	26	8

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	5904.91	5071.88	1028.4	11553.78	11273.46	13422.9	12937.31	16718.52	18436.26
2	Malaysia	8	9	10	7	7	7	7	6.37	6.4
3	Singapore	4	4	5	3	3	3	3	2.87	2.77
4	Thailand	95	102	102	83	82	82	80	70.88	70.35
5	Philippines	71	78	89	86	85	81	76	63.24	60.1
6	Laos	18042.16	20313.12	19199.04	12051.56	11789.07	11571.14	10893.82	9971.07	9459.75
7	Brunei	3	3	3	3	3	3	3	3.16	3.19
8	Cambodia	1441578	301105.5	894308.2	7004.46	6931.06	6798.66	6066.53	6766.48	6569.7
9	Myanmar	10	5	4	4	4	3	1	0.43	0.34
10	Vietnam	8	8	9	25	25	24	23	19.02	18.8

GFER

(Growth rates of Foreign Exchange Reserves)

	COUNTRY NAME	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	11.26	7.92	7.57	12.57	33.93	-9.72	39.24	17.16	7.75
2	Malaysia	61.06	59.76	-7.18	-7.81	13.99	-23.48	23.56	19.98	-7.54
3	Singapore	16.87	21.16	20.54	18.03	11.88	-7.34	5.05	2.6	4.2
4	Thailand	15.76	20.32	19.96	27.77	4.87	-30.91	10.65	18.89	-5.54
5	Philippines	34.43	6.14	29.48	6.32	58.66	-27.71	27.46	43.65	-1.28
6	Laos	40.35	52.68	-17.08	55.91	104.05	-37.42	6.53	-4.72	37.33
7	Brunei	20.57	-3.65	76.76	34.05	2.16	533.23	-47.37	-97.41	-20.99
8	Cambodia	-66.58	45.82	1107.06	72.32	42.59	13.76	9.69	-59.53	81.54
9	Myanmar (Burma)	8.48	8.04	39.41	32.98	-59.17	9	25.97	-15.67	-16
10	Vietnam	1622.22	-13.93	116.83	50.73	30.17	14.8	1.35	66.26	2.75

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	-1.6	13.7	12.97	-0.05	-5.18	24.11	3.8	25.58	-3.25
2	Malaysia	4.38	13.22	31.93	51.75	6.87	17.8	0.58	27.49	-0.38
3	Singapore	-5.73	8.53	17.05	17.15	3.45	17.37	0.36	13.94	8.69
4	Thailand	1.3	17.6	7.68	18.39	4.13	28.99	2.81	11.97	1317.33
5	Philippines	2.9	-1.14	2.44	-4.02	21.73	25.89	15.48	45.01	8.53
6	Laos	-8.18	45.49	2.13	9.72	5.93	41.76	7.09	53.6	48.98
7	Brunei	-4.14	11.84	9.99	4.89	-2.16	-6.92	35.87		
8	Cambodia	-14.06	237.36	28.57	15.8	14.79	860.69	-87.17	17.79	177.74
9	Myanmar (Burma)	79.45	17.5	17.07	22.17	14.64	60.33	1.02	41.18	28.38
10	Vietnam	7.14	12.59	50.98	13.16	28.53	47.88	1.55	26.27	32.75

GRVT

(Growth rates of Real Volume of Trade)

	COUNTRY NAME	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	-42.35	93.27	2.03	8.77	-0.04	-3.38	-49.35	-20.88	26.62
2	Malaysia	41.15	11.13	22.91	75	-29.31	-2.01	-20.73	10.88	67.71
3	Singapore	15.73	-33.32	109.83	40.41	-50.4	-1.36	49.23	4.93	-23.69
4	Thailand	22.11	9.99	13.49	85.16	-37.64	-11.16	-25.25	10.97	82.36
5	Philippines	9.34	9.49	10.46	79.2	-26.81	10.12	-12.61	6.57	58.42
6	Laos	0.64	28.46	40.53	-16.37	-0.77	-8.03	-52.17	-64.97	813.84
7	Brunei	-1.3	17.14	-2.4	4.05	-22.47	35.9	12.63	0.42	-36.1
8	Cambodia	-50	-4	949.92	1202.01	-81.32	358.03	-78.59	269.33	407.59
9	Myanmar	595.32	-526.55	-8.97	5.25	-17.5	10.41	-0.78	-39.42	-1.13
10	Vietnam	-64.99	-43.45	3.79	16.77	937.89	13.03	-7.23	9.62	-63.42

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	-18.77	-7.71	-1.65	301.13	15.49	28.18	13.33	31.67	29.88
2	Malaysia	-54.75	105.82	3.47	-6	49.4	13.82	8.25	781.85	-29.11
3	Singapore	-14.7	89.03	12.3	-0.88	48.31	34.5	1.77	-0.09	-23.05
4	Thailand	-4.55	4.02	15.93	-48.3	187.39	11.01	13.22	-6.25	34.47
5	Philippines	-17	5.88	0.77	31.03	10.54	11.36	4.7	-187.6	1.29
6	Laos	-7.19	-20.96	11.35	-17.1	42884.87	61.83	41.64	42.64	-99.67
7	Brunei	11.9	16.99	-0.26	14.24	50.62	7.27	-8.8	120.07	15.59
8	Cambodia	31.67	-64.32	175.64	-98.08	56.94	27.81	-3.63	121.22	4.73
9	Myanmar	664.87	-46.04	-38.06	43.11	-4.67	28.2	-10.32	92.17	-11.97
10	Vietnam	-0.33	12.48	21.24	279	50.64	8.35	23.29	82.41	-0.04

GRRVT

(Growth rates of Real Relative Volume of Trade)

	COUNTRY NAME	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	-34.7	131.39	4.39	11.8	2.54	-1.83	-44.68	-25.28	26.59
2	Malaysia	59.87	33.05	25.76	79.89	-27.49	-0.45	-13.42	4.72	67.67
3	Singapore	31.08	-20.17	114.69	44.33	-49.12	0.21	62.97	-0.89	-23.71
4	Thailand	38.3	31.69	16.11	90.33	-36.02	-9.74	-18.37	4.81	82.32
5	Philippines	23.84	31.08	13.02	84.19	-24.92	11.88	-4.56	0.65	58.38
6	Laos	13.99	67.34	-0.02	-14.04	1.79	-6.56	-47.76	-66.92	813.63
7	Brunei	11.79	44.49	-0.36	6.95	-20.47	38.07	22.99	-5.16	-36.11
8	Cambodia	-43.37	15.12	0.21	1238.35	-80.84	365.35	-76.62	248.81	407.48
9	Myanmar	36.99	9.85	-0.08	8.18	-15.36	12.17	8.35	-42.77	-1.15
10	Vietnam	-60.35	-16.54	-0.1	20.03	964.73	14.84	1.31	3.53	-63.43

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	-4.03	-19.12	-18.11	244.05	11.26	15.25	3.69	-84.13	76.39
2	Malaysia	-46.54	80.37	-13.84	-19.38	43.94	2.34	-0.97	6.28	-3.72
3	Singapore	0.78	65.65	-6.49	-14.98	42.89	20.93	-6.89	-87.96	4.51
4	Thailand	12.77	-8.84	-3.47	-55.66	176.89	-0.19	3.58	-88.7	82.63
5	Philippines	-1.99	-7.21	-16.09	12.38	6.5	0.12	-4.21	-89.44	37.56
6	Laos	9.65	-30.73	-7.29	-28.9	41313.67	45.5	29.58	-91.32	-99.56
7	Brunei	32.2	2.53	-16.95	-2.01	45.12	-3.55	-16.57	-86.69	56.98
8	Cambodia	55.56	-68.73	129.51	-98.35	51.21	14.91	-11.84	-85.84	42.23
9	Myanmar	803.65	-52.7	-48.41	22.74	-8.14	15.25	-17.94	-90.27	19.54
10	Vietnam	17.75	-1.43	0.95	225.07	45.14	-2.58	12.79	-87.79	35.75

GRYPC

(Growth rates of Per Capita Real GDP at Factor Cost)

	COUNTRY NAME	1992	1993	1994	1995	1996	1997	1998	1999	2000
1	Indonesia	6.77	11.81	10.29	12.66	10.93	-6.41	-56.36	44.74	16.33
2	Malaysia	17.23	10.13	8.44	16.2	10.65	-3.16	-29.69	7.09	11.58
3	Singapore	11.76	14.05	17.76	15.71	5.49	0.19	-16.87	-0.48	10.39
4	Thailand	11.92	10.69	14.16	14.79	6.99	-17.83	-26.62	8.29	-0.64
5	Philippines	13.99	0.33	15.28	13.17	9.42	-2.66	-22.46	14.54	-2.26
6	Laos	6.53	14.41	13.12	11.34	3.69	-8.87	-28.28	11.36	16.94
7	Brunei	2.25	-1.64	4.53	16.06	-1.83	-4.63	-25.83	5.41	-0.01
8	Cambodia	17.34	23.65	7.09	20.2	-0.84	-4.15	-11.26	10.59	1.89
9	Myanmar	-1.8	29.79	23.96	44.04	-0.57	22.59	6.67	-0.61	4.53
10	Vietnam	0.58	31.01	21.27	25.05	16.79	7.19	-0.04	4.06	8.51

	COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	Indonesia	-4.05	20.33	18.39	7.93	10.22	25.59	-30.98	7.29	75.69
2	Malaysia	-4.62	5.98	7.19	11.82	8.42	12.04	-15.76	5.98	46.96
3	Singapore	-10.33	2.03	4.51	14.79	6.11	11.93	-10.85	8.59	13.91
4	Thailand	-6.73	8.82	11.43	12.14	8.3	16.15	-4.65	6.08	28.09
5	Philippines	-7.97	5.85	1.78	6.94	11.49	16.72	-7.15	15.41	16.17
6	Laos	-0.56	2.68	15.37	15.44	13.1	16.04	7158.6	6.97	65.55
7	Brunei	-5.5	-0.02	8.37	13.18	14.15	-89.51	41.75	882.185	108.73
8	Cambodia	6.24	5.62	5.08	12.38	15.39	13.85	-5.91	-11.42	70.12
9	Myanmar	5.92	14.31	-0.01	-1.08	-1.33	1.88	20.03	6.09	-40.08
10	Vietnam	2.89	6.49	11.13	407.92	10.09	10.11	2.27	-16.08	7.61

The Hausman Test Result of CPI

Correlated Random Effects - Hausman Test

Equation: CPI

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.300554	1	0.0069

Source: Eviews-6, 2010

The Hausman Test Result of RER

Correlated Random Effects - Hausman Test

Equation: RER

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.667002	1	0.1024

Source: Eviews-6. 2010

Source: Eviews-6, 2010

The Hausman Test Result of GFER

Correlated Random Effects - Hausman Test

Equation: GFER

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.548718	1	0.0329

Source: Eviews-6, 2010

Source: Eviews-6, 2010

The Hausman Test Result of GRVT

Correlated Random Effects - Hausman Test

Equation: GRVT

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.855584	1	0.3550

Source: Eviews-6, 2010

The Hausman Test Result of GRRVT

Correlated Random Effects - Hausman Test

Equation: GRRVT

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.857151	1	0.3545

Source: Eviews-6, 2010

The Hausman Test Result of GRYPC

Correlated Random Effects - Hausman Test

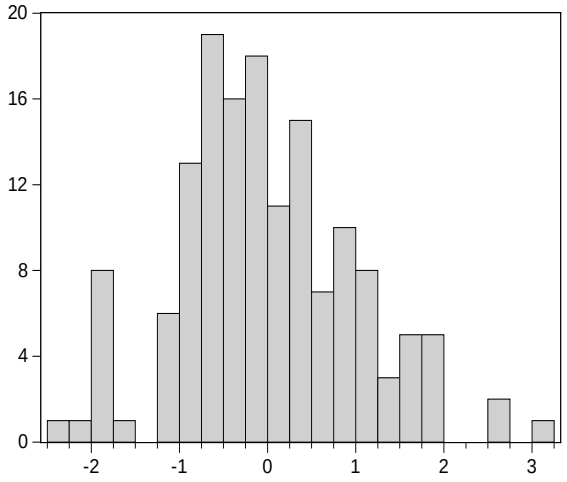
Equation: GRYPC

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.840744	1	0.3592

Source: Eviews-6, 2010

Normality Test Result of CPI

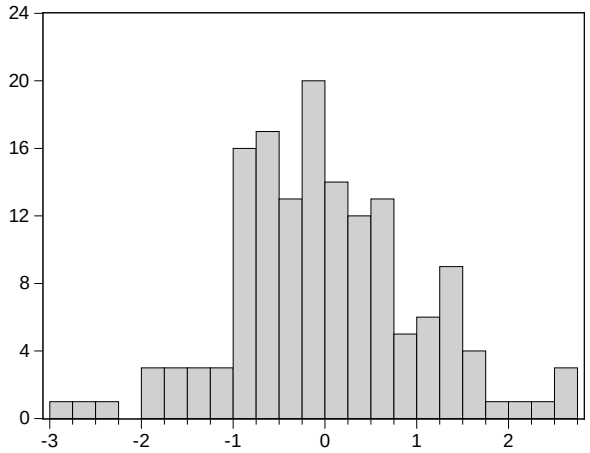


Series: Standardized Residuals
Sample 1992 2006
Observations 150

Mean	1.88e-16
Median	-0.116075
Maximum	3.138706
Minimum	-2.296712
Std. Dev.	1.001606
Skewness	0.373190
Kurtosis	3.312670
Jarque-Bera	4.092792
Probability	0.129200

Source: Eviews-6, 2010

Normality Test Result of RER

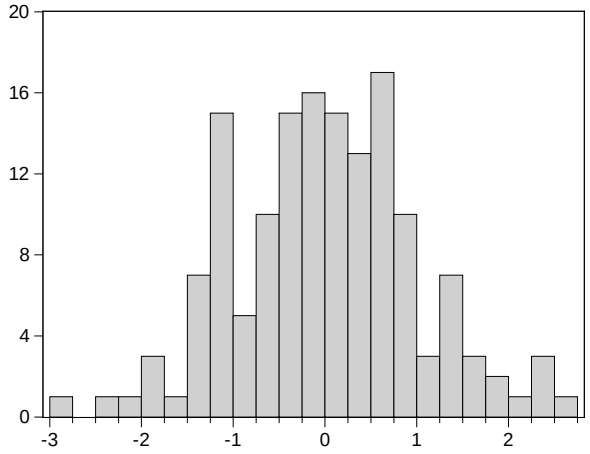


Series: Standardized Residuals
Sample 1992 2006
Observations 150

Mean	-1.63e-12
Median	-0.054884
Maximum	2.634028
Minimum	-2.844377
Std. Dev.	1.002713
Skewness	0.109010
Kurtosis	3.367828
Jarque-Bera	1.142690
Probability	0.564765

Source: Eviews-6, 2010

Normality Test Result of GFER

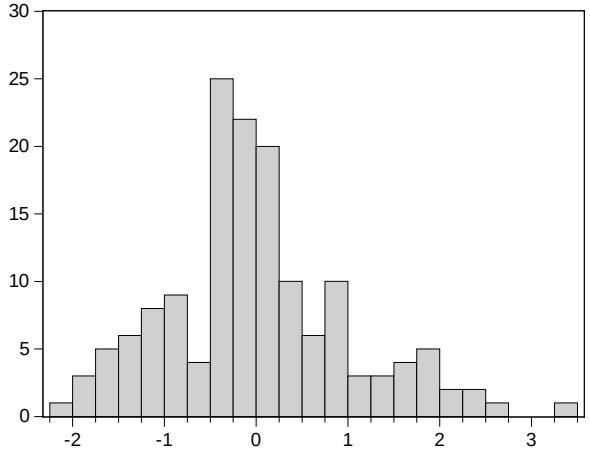


Series: Standardized Residuals
Sample 1992 2006
Observations 150

Mean	-5.40e-17
Median	-0.000442
Maximum	2.600119
Minimum	-2.799751
Std. Dev.	1.001930
Skewness	0.087299
Kurtosis	3.030403
Jarque-Bera	0.196305
Probability	0.906510

Source: Eviews-6, 2010

Normality Test Result of GRVT

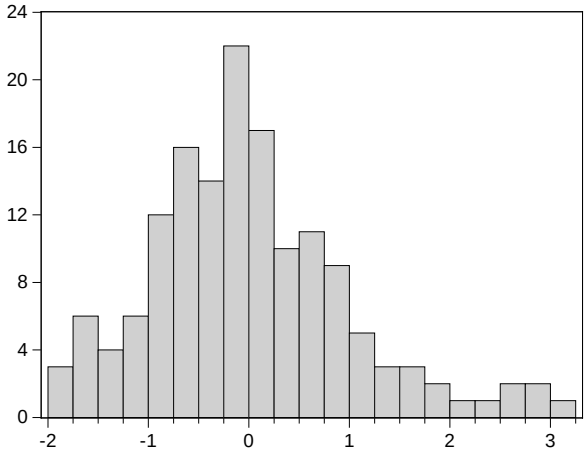


Series: Standardized Residuals
Sample 1992 2006
Observations 150

Mean	2.58e-16
Median	-0.070385
Maximum	3.437914
Minimum	-2.213304
Std. Dev.	1.003152
Skewness	0.556659
Kurtosis	3.608364
Jarque-Bera	10.05988
Probability	0.006539

Source: Eviews-6, 2010

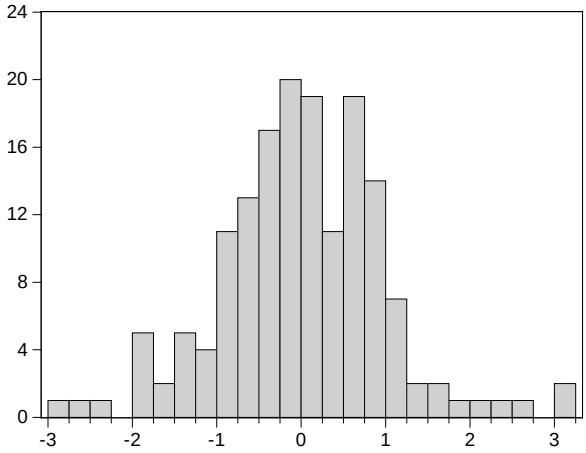
Normality Test Result of GRRVT



Series: Standardized Residuals	
Sample 1992 2006	
Observations 150	
Mean	-1.57e-16
Median	-0.125808
Maximum	3.125591
Minimum	-1.968314
Std. Dev.	1.001573
Skewness	0.692475
Kurtosis	3.724483
Jarque-Bera	15.26853
Probability	0.000484

Source: Eviews-6, 2010

Normality Test Result of GRYPC



Series: Standardized Residuals	
Sample 1992 2007	
Observations 160	
Mean	-9.31e-17
Median	-0.005787
Maximum	3.171071
Minimum	-2.853533
Std. Dev.	0.972513
Skewness	0.103443
Kurtosis	4.245845
Jarque-Bera	10.63288
Probability	0.004910

Source: Eviews-6, 2010

Durbin Watson Final Result of CPI

Dependent Variable: CPI

Method: Panel EGLS (Cross-section SUR)

Date: 03/15/10 Time: 04:10

Sample: 1992-2006

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.824031	Mean dependent var	9.370010
Adjusted R-squared	0.811372	S.D. dependent var	65.37834
S.E. of regression	1.038373	Sum squared resid	149.8722
F-statistic	65.09138	Durbin-Watson stat	1.744521
Prob(F-statistic)	0.000000		

Source: Eviews-6, 2010

Durbin Watson Final Result of RER

Dependent Variable: RER

Method: Panel EGLS (Cross-section SUR)

Date: 03/15/10 Time: 04:10

Sample: 1992-2006

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.932277	Mean dependent var	3.089471
Adjusted R-squared	0.927405	S.D. dependent var	14.88461
S.E. of regression	1.038155	Sum squared resid	149.8095
F-statistic	191.3491	Durbin-Watson stat	1.820670
Prob(F-statistic)	0.000000		

Source: Eviews-6, 2010

Durbin Watson Final Result of GFER

Dependent Variable: GFER

Method: Panel EGLS (Cross-section SUR)

Date: 03/16/10 Time: 00:56

Sample: 1992-2006

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.228518	Mean dependent var	0.486169
Adjusted R-squared	0.173016	S.D. dependent var	1.180662
S.E. of regression	1.021011	Sum squared resid	144.9023
F-statistic	4.117281	Durbin-Watson stat	2.280812
Prob(F-statistic)	0.000055		

Source: Eviews-6, 2010

Durbin Watson Final Result of GRVT

Dependent Variable: GRVT

Method: Panel EGLS (Cross-section SUR)

Date: 03/15/10 Time: 04:13

Sample: 1992-2006

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.227245	Mean dependent var	0.396072
Adjusted R-squared	0.171651	S.D. dependent var	1.144405
S.E. of regression	1.038610	Sum squared resid	149.9409
F-statistic	4.087593	Durbin-Watson stat	2.279058
Prob(F-statistic)	0.000060		

Source: Eviews-6, 2010

Durbin Watson Final Result of GRRVT

Dependent Variable: GRRVT

Method: Panel EGLS (Cross-section SUR)

Date: 03/15/10 Time: 04:15

Sample: 1992-2006

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.153866	Mean dependent var	0.376995
Adjusted R-squared	0.092993	S.D. dependent var	1.046113
S.E. of regression	1.036975	Sum squared resid	149.4690
F-statistic	2.527658	Durbin-Watson stat	2.137546
Prob(F-statistic)	0.007931		

Source: Eviews-6, 2010

Durbin Watson Final Result of GRYPC

Dependent Variable: GRYPC

Method: Panel EGLS (Period random effects)

Date: 06/14/10 Time: 21:27

Sample: 1992-2007

Periods included: 16

Cross-sections included: 10

Total panel (balanced) observations: 160

Swamy and Arora estimator of component variances

White period standard errors & covariance (d.f. corrected)

WARNING: estimated coefficient covariance matrix is of reduced rank

Weighted Statistics

R-squared	0.058549	Mean dependent var	59.64766
Adjusted R-squared	-0.004636	S.D. dependent var	569.7549
S.E. of regression	571.0740	Sum squared resid	48592699
F-statistic	0.926632	Durbin-Watson stat	2.266261
Prob(F-statistic)	0.510598		

Source: Eviews-6, 2010

Heteroskedasticity Test of CPI

Heteroskedasticity Test: White

F-statistic	0.274797	Prob. F(2,146)	0.7601
Obs*R-squared	0.558783	Prob. Chi-Square(2)	0.7562
Scaled explained SS	6.717934	Prob. Chi-Square(2)	0.0348

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 06/14/10 Time: 11:26

Sample: 2 150

Included observations: 149

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16421.54	6665.855	2.463530	0.0149
D(CPI)	50.44809	57.57364	0.876236	0.3823
(D(CPI))^2	0.029485	0.063189	0.466617	0.6415

R-squared	0.003750	Mean dependent var	16885.02
Adjusted R-squared	-0.009897	S.D. dependent var	84206.17
S.E. of regression	84621.84	Akaike info criterion	25.54970
Sum squared resid	1.05E+12	Schwarz criterion	25.61018
Log likelihood	-1900.453	Hannan-Quinn criter.	25.57427
F-statistic	0.274797	Durbin-Watson stat	1.575418
Prob(F-statistic)	0.760118		

Source: Eviews-6, 2010

Heteroskedasticity Test of RER

Heteroskedasticity Test: White

F-statistic	2.692105	Prob. F(2,146)	0.0711
Obs*R-squared	5.299412	Prob. Chi-Square(2)	0.0707
Scaled explained SS	78.25573	Prob. Chi-Square(2)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/15/10 Time: 02:11
Sample: 2 150
Included observations: 149
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.19E+10	1.12E+10	1.958803	0.0520
D(RER2)	143830.6	160197.4	0.897833	0.3708
(D(RER2))^2	0.160606	0.153492	1.046349	0.2971

R-squared	0.035567	Mean dependent var	2.62E+10
Adjusted R-squared	0.022355	S.D. dependent var	1.45E+11
S.E. of regression	1.43E+11	Akaike info criterion	54.23265
Sum squared resid	2.99E+24	Schwarz criterion	54.29313
Log likelihood	-4037.333	Hannan-Quinn criter.	54.25723
F-statistic	2.692105	Durbin-Watson stat	1.423391
Prob(F-statistic)	0.071101		

Source: Eviews-6, 2010

Heteroskedasticity Test of GFER

Heteroskedasticity Test: White

F-statistic	0.062347	Prob. F(2,147)	0.9396
Obs*R-squared	0.127131	Prob. Chi-Square(2)	0.9384
Scaled explained SS	3.214791	Prob. Chi-Square(2)	0.2004

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 06/14/10 Time: 11:32

Sample: 1 150

Included observations: 150

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14630.89	8435.529	1.734436	0.0849
GFER	49.42840	67.88638	0.728105	0.4677
GFER^2	-0.041424	0.050985	-0.812460	0.4178

R-squared	0.000848	Mean dependent var	15365.32
Adjusted R-squared	-0.012746	S.D. dependent var	111119.3
S.E. of regression	111825.2	Akaike info criterion	26.10706
Sum squared resid	1.84E+12	Schwarz criterion	26.16727
Log likelihood	-1955.029	Hannan-Quinn criter.	26.13152
F-statistic	0.062347	Durbin-Watson stat	2.034553
Prob(F-statistic)	0.939582		

Source: Eviews-6, 2010

Heteroskedasticity Test of GRVT

Heteroskedasticity Test: White

F-statistic	0.070572	Prob. F(2,147)	0.9319
Obs*R-squared	0.143887	Prob. Chi-Square(2)	0.9306
Scaled explained SS	10.24163	Prob. Chi-Square(2)	0.0060

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 06/14/10 Time: 11:37

Sample: 1 150

Included observations: 150

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12442438	12409342	1.002667	0.3177
GRVT	-22181.91	22692.29	-0.977509	0.3299
GRVT^2	0.510489	0.522533	0.976951	0.3302

R-squared	0.000959	Mean dependent var	11311538
Adjusted R-squared	-0.012633	S.D. dependent var	1.37E+08
S.E. of regression	1.38E+08	Akaike info criterion	40.34477
Sum squared resid	2.80E+18	Schwarz criterion	40.40498
Log likelihood	-3022.858	Hannan-Quinn criter.	40.36923
F-statistic	0.070572	Durbin-Watson stat	2.015963
Prob(F-statistic)	0.931892		

Source: Eviews-6, 2010

Heteroskedasticity Test of GRRVT

Heteroskedasticity Test: White

F-statistic	0.098904	Prob. F(2,147)	0.9059
Obs*R-squared	0.201574	Prob. Chi-Square(2)	0.9041
Scaled explained SS	14.34762	Prob. Chi-Square(2)	0.0008

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 06/14/10 Time: 11:41

Sample: 1 150

Included observations: 150

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12630088	12593812	1.002880	0.3176
GRRVT	-30015.60	31244.19	-0.960678	0.3383
GRRVT^2	0.719155	0.749167	0.959940	0.3387

R-squared	0.001344	Mean dependent var	11311513
Adjusted R-squared	-0.012243	S.D. dependent var	1.37E+08
S.E. of regression	1.38E+08	Akaike info criterion	40.34437
Sum squared resid	2.80E+18	Schwarz criterion	40.40459
Log likelihood	-3022.828	Hannan-Quinn criter.	40.36884
F-statistic	0.098904	Durbin-Watson stat	2.016822
Prob(F-statistic)	0.905890		

Source: Eviews-6, 2010

Heteroskedasticity Test of GRYPC

Heteroskedasticity Test: White

F-statistic	0.183219	Prob. F(2,147)	0.8328
Obs*R-squared	0.372986	Prob. Chi-Square(2)	0.8299
Scaled explained SS	25.67423	Prob. Chi-Square(2)	0.0000

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 06/14/10 Time: 11:43

Sample: 1 150

Included observations: 150

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	274726.2	269980.2	1.017579	0.3105
GRYPC	12985.20	13496.34	0.962127	0.3376
GRYPC^2	-32.93655	34.22327	-0.962402	0.3374

R-squared	0.002487	Mean dependent var	344393.1
Adjusted R-squared	-0.011085	S.D. dependent var	4109169.
S.E. of regression	4131881.	Akaike info criterion	33.32616
Sum squared resid	2.51E+15	Schwarz criterion	33.38637
Log likelihood	-2496.462	Hannan-Quinn criter.	33.35062
F-statistic	0.183219	Durbin-Watson stat	2.021717
Prob(F-statistic)	0.832776		

Source: Eviews-6, 2010

Jointly Regression Coefficient Test (F test) of CPI

Dependent Variable: CPIZ

Method: Panel EGLS (Cross-section SUR)

Date: 06/12/10 Time: 05:26

Sample: 1995-2009

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.893436	Mean dependent var	37.19267
Adjusted R-squared	0.885769	S.D. dependent var	80.79127
S.E. of regression	1.037009	Sum squared resid	149.4790
F-statistic	116.5376	Durbin-Watson stat	1.774320
Prob(F-statistic)	0.000000		

Source: Eviews-6, 2010

Jointly Regression Coefficient Test (F test) of RER

Dependent Variable: RER1

Method: Panel EGLS (Cross-section weights)

Date: 06/14/10 Time: 21:05

Sample: 1994-2009

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

Weighted Statistics

R-squared	0.779725	Mean dependent var	419850.7
Adjusted R-squared	0.763878	S.D. dependent var	331336.7
S.E. of regression	137296.3	Sum squared resid	2.62E+12
F-statistic	49.20291	Durbin-Watson stat	1.005814
Prob(F-statistic)	0.000000		

Source: Eviews-6, 2010

Jointly Regression Coefficient Test (F test) of GFER

Dependent Variable: GFER10A

Method: Panel EGLS (Cross-section SUR)

Date: 06/12/10 Time: 05:32

Sample: 1995-2009

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.208671	Mean dependent var	0.424142
Adjusted R-squared	0.151741	S.D. dependent var	1.231802
S.E. of regression	1.037345	Sum squared resid	149.5758
F-statistic	3.665381	Durbin-Watson stat	1.980927
Prob(F-statistic)	0.000229		

Source: Eviews-6, 2010

Jointly Regression Coefficient Test (F test) of GRVT

Dependent Variable: GRVT1

Method: Panel EGLS (Cross-section SUR)

Date: 03/15/10 Time: 04:13

Sample: 1995-2009

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.227245	Mean dependent var	0.396072
Adjusted R-squared	0.171651	S.D. dependent var	1.144405
S.E. of regression	1.038610	Sum squared resid	149.9409
F-statistic	4.087593	Durbin-Watson stat	2.279058
Prob(F-statistic)	0.000060		

Source: Eviews-6, 2010

Jointly Regression Coefficient Test (F test) of GRRVT

Dependent Variable: GRRVT2

Method: Panel EGLS (Cross-section SUR)

Date: 06/12/10 Time: 05:38

Sample: 1992-2006

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.215075	Mean dependent var	0.249436
Adjusted R-squared	0.158605	S.D. dependent var	1.088180
S.E. of regression	1.022807	Sum squared resid	145.4128
F-statistic	3.808692	Durbin-Watson stat	2.102288
Prob(F-statistic)	0.000146		

Source: Eviews-6, 2010

Jointly Regression Coefficient Test (F test) of GRYPC

Dependent Variable: GRYPC01

Method: Panel EGLS (Cross-section SUR)

Date: 06/14/10 Time: 14:13

Sample: 1994-2009

Periods included: 16

Cross-sections included: 10

Total panel (balanced) observations: 160

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.403191	Mean dependent var	0.304740
Adjusted R-squared	0.363137	S.D. dependent var	1.239788
S.E. of regression	1.004618	Sum squared resid	150.3793
F-statistic	10.06611	Durbin-Watson stat	2.015043
Prob(F-statistic)	0.000000		

Source: Eviews-6, 2010

Individuality Coefficient Regression Test (t-Test) of CPI

Dependent Variable: CPI
Method: Panel EGLS (Cross-section SUR)
Date: 03/15/10 Time: 04:10
Sample: 1992-2006
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	192.9422	3.589929	53.74540	0.0000
CPI	-0.074370	0.021215	-3.505541	0.0006

Source: Eviews-6,2010

Individuality Coefficient Regression Test (t-Test) of RER

Dependent Variable: RER
Method: Panel EGLS (Cross-section weights)
Date: 06/14/10 Time: 13:45
Sample: 1992-2006
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	25372.48	2668.570	9.507893	0.0000
RER	0.271431	0.076017	3.570641	0.0005

Source: Eviews-6,2010

Individuality Coefficient Regression Test (t-Test) of GFER

Dependent Variable: GFER10
Method: Panel EGLS (Cross-section SUR)
Date: 06/14/10 Time: 13:58
Sample: 1992-2006
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	34.05601	1.187934	28.66826	0.0000
GFER	-0.060816	0.012900	-4.714400	0.0000

Source: Eviews-6, 2010

Individuality Coefficient Regression Test (t-Test) of GRVT

Dependent Variable: GRVT
Method: Panel EGLS (Cross-section SUR)
Date: 06/14/10 Time: 14:04
Sample: 1992-2006
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	387.4942	7.564075	51.22823	0.0000
GRVT	-0.162962	0.022860	-7.128640	0.0000

Source: Eviews-6, 2010

Individuality Coefficient Regression Test (t-Test) of GRRVT

Dependent Variable: GRRVT
Method: Panel EGLS (Cross-section SUR)
Date: 06/14/10 Time: 14:08
Sample: 1992-2006
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	382.7303	22.65222	16.89593	0.0000
GRRVT	-0.229850	0.064308	-3.574230	0.0005

Source: Eviews-6, 2010

Individuality Coefficient Regression Test (t-Test) of GRYPC

Dependent Variable: GRYPC
Method: Panel EGLS (Period random effects)
Date: 06/14/10 Time: 21:27
Sample: 1992-2007
Periods included: 16
Cross-sections included: 10
Total panel (balanced) observations: 160
Swamy and Arora estimator of component variances
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	62.78007	0.124626	503.7482	0.0000
GRYPC	-0.059168	0.002354	-25.13457	0.0000

Source: Eviews-6, 2010

R^2 Determination Coefficient Test of CPI

Dependent Variable: CPIZ

Method: Panel EGLS (Cross-section SUR)

Date: 06/12/10 Time: 05:26

Sample: 1995-2009

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.893436	Mean dependent var	37.19267
Adjusted R-squared	0.885769	S.D. dependent var	80.79127

Source: Eviews-6, 2010

R^2 Determination Coefficient Test of RER

Dependent Variable: RER1

Method: Panel EGLS (Cross-section weights)

Date: 06/14/10 Time: 21:05

Sample: 1992 2006

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

Weighted Statistics

R-squared	0.779725	Mean dependent var	419850.7
Adjusted R-squared	0.763878	S.D. dependent var	331336.7

Source: Eviews-6, 2010

R^2 Determination Coefficient Test of GFER

Dependent Variable: GFER10A

Method: Panel EGLS (Cross-section SUR)

Date: 06/12/10 Time: 05:32

Sample: 1995-2009

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.208671	Mean dependent var	0.424142
Adjusted R-squared	0.151741	S.D. dependent var	1.231802

Source: Eviews-6, 2010

R^2 Determination Coefficient Test of GRVT

Dependent Variable: GRVT1

Method: Panel EGLS (Cross-section SUR)

Date: 03/15/10 Time: 04:13

Sample: 1995-2009

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.227245	Mean dependent var	0.396072
Adjusted R-squared	0.171651	S.D. dependent var	1.144405
S.E. of regression	1.038610	Sum squared resid	149.9409
F-statistic	4.087593	Durbin-Watson stat	2.279058
Prob(F-statistic)	0.000060		

Source: Eviews-6, 2010

R^2 Determination Coefficient Test of GRRVT

Dependent Variable: GRRVT1

Method: Panel EGLS (Cross-section SUR)

Date: 03/15/10 Time: 04:15

Sample: 1995-2009

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.153866	Mean dependent var	0.376995
Adjusted R-squared	0.092993	S.D. dependent var	1.046113
S.E. of regression	1.036975	Sum squared resid	149.4690
F-statistic	2.527658	Durbin-Watson stat	2.137546
Prob(F-statistic)	0.007931		

Source: Eviews-6, 2010

R^2 Determination Coefficient Test of GRYPC

Dependent Variable: GRYPC01

Method: Panel EGLS (Cross-section SUR)

Date: 06/14/10 Time: 14:13

Sample: 1994-2009

Periods included: 16

Cross-sections included: 10

Total panel (balanced) observations: 160

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Weighted Statistics

R-squared	0.403191	Mean dependent var	0.304740
Adjusted R-squared	0.363137	S.D. dependent var	1.239788
S.E. of regression	1.004618	Sum squared resid	150.3793
F-statistic	10.06611	Durbin-Watson stat	2.015043
Prob(F-statistic)	0.000000		

Source: Eviews-6, 2010

The Final Result of CPI

Dependent Variable: CPIW
Method: Panel EGLS (Cross-section SUR)
Date: 03/15/10 Time: 04:10
Sample: 1992-2006
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	192.9422	3.589929	53.74540	0.0000
CPIZ	-0.074370	0.021215	-3.505541	0.0006

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.824031	Mean dependent var	9.370010
Adjusted R-squared	0.811372	S.D. dependent var	65.37834
S.E. of regression	1.038373	Sum squared resid	149.8722
F-statistic	65.09138	Durbin-Watson stat	1.744521
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.489614	Mean dependent var	180.3168
Sum squared resid	1905506.	Durbin-Watson stat	1.305477

Source: Eviews-6, 2010

The Final Result of CPI

Dependent Variable: CPIZ
Method: Panel EGLS (Cross-section SUR)
Date: 06/12/10 Time: 05:26
Sample: 1995-2009
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	178.5497	8.514524	20.97001	0.0000
CPIW	-0.048720	0.047228	-1.031592	0.3041

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.893436	Mean dependent var	37.19267
Adjusted R-squared	0.885769	S.D. dependent var	80.79127
S.E. of regression	1.037009	Sum squared resid	149.4790
F-statistic	116.5376	Durbin-Watson stat	1.774320
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.404309	Mean dependent var	169.7647
Sum squared resid	1891760.	Durbin-Watson stat	1.290747

Source: Eviews-6, 2010

The Final Result of RER

Dependent Variable: RER2
Method: Panel EGLS (Cross-section SUR)
Date: 06/15/10 Time: 06:33
Sample: 1992 2006
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	36133.48	1306.627	27.65401	0.0000
RER1	-0.035109	0.037221	-0.943269	0.3472

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.964923	Mean dependent var	5.027249
Adjusted R-squared	0.962399	S.D. dependent var	18.84473
S.E. of regression	1.038749	Sum squared resid	149.9811
F-statistic	382.3695	Durbin-Watson stat	1.777051
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.322644	Mean dependent var	34900.98
Sum squared resid	3.02E+12	Durbin-Watson stat	1.300617

Source: Eviews-6, 2010

The Final Result of RER

Dependent Variable: RER1
Method: Panel EGLS (Cross-section SUR)
Date: 06/15/10 Time: 06:32
Sample: 1992 2006
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	35691.97	3025.876	11.79558	0.0000
RER2	-0.016827	0.086699	-0.194079	0.8464

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.932277	Mean dependent var	3.089471
Adjusted R-squared	0.927405	S.D. dependent var	14.88461
S.E. of regression	1.038155	Sum squared resid	149.8095
F-statistic	191.3491	Durbin-Watson stat	1.820670
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.331913	Mean dependent var	35104.70
Sum squared resid	2.98E+12	Durbin-Watson stat	1.395856

Source: Eviews-6, 2010

The Final Result of GFER

Dependent Variable: GFER10B

Method: Panel EGLS (Cross-section SUR)

Date: 03/16/10 Time: 00:56

Sample: 1992-2006

Periods included: 15

Cross-sections included: 10

Total panel (balanced) observations: 150

Linear estimation after one-step weighting matrix

White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	34.05601	1.029247	33.08827	0.0000
GFER10A	-0.060816	0.006004	-10.12921	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.228518	Mean dependent var	0.486169
Adjusted R-squared	0.173016	S.D. dependent var	1.180662
S.E. of regression	1.021011	Sum squared resid	144.9023
F-statistic	4.117281	Durbin-Watson stat	2.280812
Prob(F-statistic)	0.000055		

Unweighted Statistics

R-squared	0.135072	Mean dependent var	31.42213
Sum squared resid	1997646.	Durbin-Watson stat	2.386959

Source: Eviews-6, 2010

The Final Result of GFER

Dependent Variable: GFER10A
Method: Panel EGLS (Cross-section SUR)
Date: 06/12/10 Time: 05:32
Sample: 1995-2009
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	51.55102	1.195721	43.11291	0.0000
GFER10B	-0.262300	0.041766	-6.280198	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.208671	Mean dependent var	0.424142
Adjusted R-squared	0.151741	S.D. dependent var	1.231802
S.E. of regression	1.037345	Sum squared resid	149.5758
F-statistic	3.665381	Durbin-Watson stat	1.980927
Prob(F-statistic)	0.000229		

Unweighted Statistics

R-squared	0.104858	Mean dependent var	43.30900
Sum squared resid	4306429.	Durbin-Watson stat	1.379488

Source: Eviews-6, 2010

The Final Result of GRVT

Dependent Variable: GRVT1
Method: Panel EGLS (Cross-section SUR)
Date: 03/15/10 Time: 04:13
Sample: 1995-2009
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	359.6479	1.945268	184.8835	0.0000
GRVT2	-0.076913	0.005747	-13.38307	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.227245	Mean dependent var	0.396072
Adjusted R-squared	0.171651	S.D. dependent var	1.144405
S.E. of regression	1.038610	Sum squared resid	149.9409
F-statistic	4.087593	Durbin-Watson stat	2.279058
Prob(F-statistic)	0.000060		

Unweighted Statistics

R-squared	0.065826	Mean dependent var	334.0314
Sum squared resid	1.71E+09	Durbin-Watson stat	2.308973

The Final Result of GRVT

Dependent Variable: GRVT2
Method: Panel EGLS (Cross-section SUR)
Date: 06/12/10 Time: 05:36
Sample: 1992-2006
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	387.4942	7.564075	51.22823	0.0000
GRVT1	-0.162962	0.022860	-7.128640	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.228723	Mean dependent var	0.361431
Adjusted R-squared	0.173235	S.D. dependent var	1.098662
S.E. of regression	1.028618	Sum squared resid	147.0695
F-statistic	4.122048	Durbin-Watson stat	2.068482
Prob(F-statistic)	0.000054		

Unweighted Statistics

R-squared	0.058012	Mean dependent var	333.0598
Sum squared resid	1.72E+09	Durbin-Watson stat	2.337577

The Final Result of GRRVT

Dependent Variable: GRRVT1
Method: Panel EGLS (Cross-section SUR)
Date: 03/15/10 Time: 04:15
Sample: 1995-2009
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	354.5263	11.77159	30.11711	0.0000
GRRVT2	-0.120239	0.034846	-3.450621	0.0007

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.153866	Mean dependent var	0.376995
Adjusted R-squared	0.092993	S.D. dependent var	1.046113
S.E. of regression	1.036975	Sum squared resid	149.4690
F-statistic	2.527658	Durbin-Watson stat	2.137546
Prob(F-statistic)	0.007931		

Unweighted Statistics

R-squared	0.064727	Mean dependent var	317.2757
Sum squared resid	1.59E+09	Durbin-Watson stat	2.326318

Source: Eviews-6, 2010

The Final Result of GRRVT

Dependent Variable: GRRVT2
Method: Panel EGLS (Cross-section SUR)
Date: 06/12/10 Time: 05:38
Sample: 1992-2006
Periods included: 15
Cross-sections included: 10
Total panel (balanced) observations: 150
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	382.7303	22.65222	16.89593	0.0000
GRRVT1	-0.229850	0.064308	-3.574230	0.0005

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.215075	Mean dependent var	0.249436
Adjusted R-squared	0.158605	S.D. dependent var	1.088180
S.E. of regression	1.022807	Sum squared resid	145.4128
F-statistic	3.808692	Durbin-Watson stat	2.102288
Prob(F-statistic)	0.000146		

Unweighted Statistics

R-squared	0.044146	Mean dependent var	309.8044
Sum squared resid	1.62E+09	Durbin-Watson stat	2.359298

Source: Eviews-6, 2010

The Final Result of GRYPC

Dependent Variable: GRYPC02
Method: Panel EGLS (Period random effects)
Date: 06/14/10 Time: 21:27
Sample: 1992-2007
Periods included: 16
Cross-sections included: 10
Total panel (balanced) observations: 160
Swamy and Arora estimator of component variances
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	62.78007	0.124626	503.7482	0.0000
GRYPC01	-0.059168	0.002354	-25.13457	0.0000

Effects Specification	S.D.	Rho
Cross-section fixed (dummy variables)		
Period random	23.33440	0.0017
Idiosyncratic random	572.9759	0.9983

Weighted Statistics			
R-squared	0.058549	Mean dependent var	59.64766
Adjusted R-squared	-0.004636	S.D. dependent var	569.7549
S.E. of regression	571.0740	Sum squared resid	48592699
F-statistic	0.926632	Durbin-Watson stat	2.266261
Prob(F-statistic)	0.510598		

Unweighted Statistics			
R-squared	0.058463	Mean dependent var	59.64766
Sum squared resid	48668989	Durbin-Watson stat	2.265895

Source: Eviews-6, 2010

The Final Result of GRYPC

Dependent Variable: GRYPC01
Method: Panel EGLS (Cross-section SUR)
Date: 06/14/10 Time: 14:13
Sample: 1994-2009
Periods included: 16
Cross-sections included: 10
Total panel (balanced) observations: 160
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	58.59564	1.838066	31.87897	0.0000
GRYPC02	-0.094799	0.002706	-35.02649	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.403191	Mean dependent var	0.304740
Adjusted R-squared	0.363137	S.D. dependent var	1.239788
S.E. of regression	1.004618	Sum squared resid	150.3793
F-statistic	10.06611	Durbin-Watson stat	2.015043
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.058264	Mean dependent var	52.94113
Sum squared resid	48033317	Durbin-Watson stat	1.155305

Source: Eviews-6, 2010